

MARINE REVIEW.

VOL. XI.

CLEVELAND, O., MAY 9, 1895.

No. 19.

Iron Ore Record.

STOCKS ON DOCK PRACTICALLY THE SAME AS THEY WERE A YEAR AGO—
SURPLUS IS MAINLY NON-BESSEMER—SHIPMENTS FROM DOCKS
TO FURNACES EXCEED ALL PREVIOUS RECORDS.

As had been anticipated by figures collected for the ore dealers of Cleveland on April 1, the amount of ore of all kinds on Lake Erie docks is practically the same as it was a year ago. Reports have just been received from all docks showing stocks on hand May 1, and the total is 2,642,980 gross tons, against 2,588,370 tons on the same date in 1894. This would be an unfavorable statement if it were not fully understood that the great bulk of this ore is non-Bessemer and that such of it as is of the standard Bessemer kind is entirely sold. The great change from iron to steel is, of course, the main cause of this surplus of low grade ores on hand, while Bessemer stocks are only equal to requirements. It is the demand for Bessemer ores that gives certain assurance of a production of ores of all kinds aggregating 8,000,000 tons or more this season notwithstanding this condition of stocks.

At the close of navigation, Dec. 1, 1894, the stocks on dock amounted to 4,834,247 tons, and deducting from this 2,642,980 tons now on dock, we find that shipments to furnaces during the past winter amounted to 2,191,267 tons, which added to 4,104,948 tons the amount shipped to furnaces during the season of navigation in 1894, gives 6,296,215 tons as the entire consumption of ore from Lake Erie ports during the year ending May 1, 1895. This is an amount greater than has ever before been moved from Lake Erie docks to furnaces in a single year. During the year ending May 1, 1893—the banner year—the movement to furnaces from docks aggregated 6,102,125 tons, while last year it was only 4,840,488 tons. The following tables give full details of stock and shipments to furnaces,

IRON ORE ON LAKE ERIE DOCKS—GROSS TONS.

PORTS.	Opening of Navigation.			Close of Navigation.		
	May 1, 1895.	May 1, 1894.	May 1, 1893.	Dec. 1, 1894.	Dec. 1, 1893.	Dec. 1, 1892.
Toledo.....	32,625	44,500	11,863	96,157	92,911	71,409
Sandusky.....	67,542	65,772	74,875	77,004	78,439	87,500
Huron.....	80,864	56,791	40,000	147,632	89,000	45,000
Lorain.....	185,306	170,391	99,300	223,733	201,632	147,600
Cleveland.....	718,753	821,923	628,639	1,441,785	1,163,930	1,347,992
Fairport.....	371,730	311,494	287,727	660,980	578,033	610,609
Ashtabula.....	787,566	762,139	712,355	1,439,119	1,296,431	1,312,658
Conneaut.....	128,823	68,485	.....	199,365	91,337	.....
Erie.....	212,643	222,094	173,569	454,233	359,827	401,683
Buffalo.....	57,128	64,781	67,469	94,239	119,170	125,000
Total.....	2,642,980	2,588,370	2,095,797	4,834,247	4,070,710	4,149,451

The following table shows amounts of ore on dock May 1, during ten years past:

Year.	Gross Tons.	Year.	Gross Tons.
1886.....	373,321	1891.....	2,662,223
1887.....	149,304	1892.....	1,537,188
1888.....	703,720	1893.....	2,095,797
1889.....	588,753	1894.....	2,588,370
1890.....	936,228	1895.....	2,642,980

IRON ORE SHIPMENTS, LAKE ERIE PORTS TO FURNACES, FULL YEARS.

Year ending—	Gross Tons.	Year ending—	Gross tons.
May 1, 1895.....	6,296,215	May 1, 1892.....	5,802,496
May 1, 1894.....	4,870,488	May 1, 1891.....	5,148,669
May 1, 1893.....	6,102,125	May 1, 1890.....	4,936,637

IRON ORE SHIPMENTS, LAKE ERIE PORTS TO FURNACES, DURING WINTER PERIOD, DEC. 1, TO MAY 1.

Winter of—	Gross Tons.	Winter of—	Gross Tons.
1894-95.....	2,191,267	1891-92.....	1,971,301
1893-94.....	1,512,340	1890-91.....	1,231,264
1892-93.....	2,053,654	1889-90.....	1,670,878

Meaning of Reduced Draft.

In order to convey an idea of the results of low water now prevailing throughout the lakes, the REVIEW secured from Cleveland vessel owners the following statement, showing, in the cases of forty-three representative ore carriers, the amount of ore taken from Lake Superior on the first trip in 1894, as against the amount carried on the first trip in 1895. The statement shows an average loss of 8 per cent. Although

the average loss shown in the cargoes of these boats is not as great as was expected, the item of 8 per cent. is important. In the ore trade alone, allowing for only a corresponding decrease in cargoes from Escanaba, it means a loss of 720,000 tons on a production of nine millions; and 720,000 tons means 400 cargoes of 1800 tons each. Since the opening of navigation this spring the average draft at the Sault canal has been about 13 feet 8 inches, or about 10 inches less than the draft of a year ago. Following is the statement of cargoes:

	First cargo in 1894, gross tons.	First cargo in 1895, gross tons.	Decrease, gross tons.
Spokane.....	2,326	2,167	159
Olympia.....	1,754	1,556	198
Sauber, W. F.....	1,997	1,847	150
Mitchell, John.....	1,877	1,626	251
Schuck, R. E.....	1,966	1,665	301
Craig, John.....	1,971	1,628	343
Castalia.....	2,073	1,975	98
Peck, E. M.....	1,904	1,712	192
Brown, Fayette.....	1,865	1,682	183
La Salle.....	2,094	1,804	290
Andaste.....	2,082	1,947	135
Wawatam.....	1,974	1,769	205
Griffin.....	1,888	1,752	136
Choctaw.....	2,103	1,948	155
Grover, M. B.....	1,738	1,481	257
Republic.....	2,206	1,981	225
Iosco.....	2,022	1,879	143
Eddy, Selwyn.....	2,974	2,779	195
Onoko.....	2,246	2,101	145
Lockwood, J. C.....	1,950	1,633	317
Pontiac.....	2,309	2,162	147
Barge 129.....	2,550	2,255	295
Barge 109.....	2,174	2,039	135
Cadillac.....	1,893	1,785	108
Manola.....	2,053	1,895	158
Mariska.....	2,065	1,956	109
Maruba.....	2,061	1,946	115
Matoa.....	2,129	1,951	178
Marina.....	2,106	1,839	267
Masaba.....	2,072	1,936	136
Maritana.....	2,662	2,513	149
Mariposa.....	2,631	2,528	103
Pathfinder.....	2,376	2,239	137
Sagamore.....	2,669	2,451	218
Barge 132.....	2,411	2,289	122
Bartlett.....	1,714	1,638	76
Barge 103.....	2,035	1,935	100
Barge 101.....	1,250	1,167	83
Colgate.....	2,143	2,143	.....
Barge 106.....	2,180	2,004	176
Vega.....	2,189	2,055	134
Vulcan.....	1,875	1,759	116
Owen, John.....	2,212	2,050	162
Total.....	90,769	83,467	7,302

Average loss on forty-three cargoes, 8 per cent.

Lake Freights—Buffalo Fuel Matters.

The demand for boats to load grain at both Chicago and Duluth has been sufficient since the opening of navigation to maintain ore freights at the opening figures—75 cents from the head of Lake Superior, 60 cents from Marquette and 40 cents from Escanaba. The market is, in fact, strong at these figures, so that conditions since the opening have been somewhat favorable to the vessel interests. The volume of freight moving in all departments of the lake trade is sufficient to cause hope of steady improvement as the season advances. The probability of labor troubles now seems to be the only drawback to a bright outlook. As shown in the dock reports regarding iron ore, the shipments to furnaces during the year ending May 1 were the greatest ever recorded.

Coal shipments are still delayed and for various reasons the movement of coal will be light for some time to come, but this was expected. There is reason now to expect, more than at any time since the season opened, that vessel owners will win in their opposition to abuses in the fueling business at Buffalo. Vessel owners are united, and there is no profit in hard coal freights to prompt a break in the ranks.

"AROUND THE LAKES" IS THE TITLE OF A BOOK CONTAINING A LIST OF ALL LAKE VESSELS WITH POST OFFICE ADDRESS OF MANAGING OWNERS. ILLUSTRATIONS ALL HIGH-CLASS PHOTO-ENGRAVINGS. SOLD BY THE MARINE REVIEW AT \$2.

The Boiler Question.

In the opposition shown by James Howden and a few other English engineers to the adoption of water tube boilers for British vessels of war the principal arguments urged against the use of water tube boilers at sea have been based on past experience. On this score, the Engineer of London, which was, a short time ago, rather on the side of the Scotch boilers, and which is not at any time inclined to favor anything that is not English, says:

"It is nothing at all to the point to say that the water tube boiler having failed when tried thirty years ago, it must fail now. If such a contention could hold good, then the surface condenser must not be used. Even the Scotch boiler, of which Mr. Howden thinks so highly, could not have existed thirty years ago. It has only been adapted to the wants of the present day by the labors of the steel makers on the one hand, and by the Fox and the Purves furnaces on the other. To prove that the water tube boiler is not fit for marine work we must put the past away and direct our attention to the present. It must be shown that any one of several recent types of water tube boiler are certain to fail, and the reason why they will fail must be stated in a way intelligible to engineers. But this is just what neither Mr. Howden nor anyone else has done. We ourselves have said before, and we now say again, that we think the admiralty have been too precipitate in ordering Belleville boilers for two first-class battleships at once. The experiment is being carried out on too great a scale. But we have to admit all the while that we really have no knowledge of anything which is likely to make the experiments end in failure. The most that Mr. Howden has to urge is hearsay. He maintains that the boilers of the ships of the Messageries are constantly under repair. 'On every voyage,' he says 'a greater or lesser number of these boilers are under repair, and have tubes replaced, notwithstanding their large size and thickness. It is a well-known fact that on the arrival of these steamers at Sydney many tubes which have bent under the action of the heat are sent ashore for repair.' All this may, of course, be quite true, but we believe that Mr. Howden has been misinformed, just as he was concerning the feeding arrangements for these boilers. At the Institute of Naval Architects' meeting last year, he stated that as there were twenty boilers in each of the Messageries' boats, and inasmuch as the water level required regulating with the utmost care, no fewer than twenty extra water tenders were needed to look after the feed; and he evidently learned on that occasion with some surprise that one Arab fireman on each watch sufficed to keep the water line right in all the twenty boilers. However, the most persistent argument used by Mr. Howden is that the Belleville boiler is very uneconomical as compared with the Scotch boiler. This may be the case; but, again, Mr. Howden has nothing but hearsay evidence to bring to bear, and against this is the result of several precise experiments, records of which are quite available, and show that the Belleville is at least as good as other boilers in this respect. Thus, for example, certain very carefully conducted experiments show that the Belleville boiler, burning 28 pounds of coal per square foot of grate per hour, evaporated 7.83 pounds of water to dry steam of 200 pounds pressure from 50 degrees, while a Scotch three-furnaced boiler did almost precisely the same duty at the same rate of combustion, the pressure being 132 pounds. We can not find a single instance in which the Belleville boiler broke down.

"So far as we understand Mr. Howden, he holds that the Scotch boiler, fitted with his hot air appliances, is sufficient for all the demands of the admiralty. At first sight this statement seems so ridiculous that we advance it with diffidence. We think it is a great pity that the admiralty have not given Mr. Howden an opportunity of showing on board a warship what he can do. Indeed, we have no doubt but that he could achieve results which can not be got now out of the Scotch type. But conceding this, it does not follow that the cylindrical boiler can possibly meet all the admiralty requirements. Generators of this type could not be used in such craft as the *Hornet*, for example. Apparently Mr. Howden would tolerate in such boats the locomotive boiler, but he forgets that the locomotive type has not given the speeds that the express water tube boiler has given. He writes: 'The locomotive boiler which the admiralty has discarded for the light water tube boilers in these 27-knot craft has, like the cylindrical boiler, been driven out of these light steamers by the destructive admiralty forced draft. The thousands of locomotives running express trains from year to year without trouble on our railways, prove the real endurance and economy of this boiler, and if we want to have these fast light craft which will be really serviceable at sea over considerable periods, we must come back to the locomotive boiler, but worked with something different from the admiralty forced draft.' Mr. Howden seems to be unaware of the fact that a true locomotive boiler has never been tried at sea yet, and that its shape renders it unsuitable for the purpose. There are radical differences of the greatest importance between the locomotive type boiler used in torpedo boats and the locomotive boiler used on a railway. Neither the torpedo boat boiler nor forced draft originated at the admiralty, and Mr. Howden has yet to show how 27 knots can be got without the forced draft that he condemns."

Standardized Screw Method of Conducting Trials.

Past-Assistant Engineer W. M. McFarland of the United States navy, writing of the present method of conducting trials of United States ships, has the following to say of the Bancroft, or standardized screw method, which was brought to the attention of the navy department by Engineer-in-Chief Melville, and which derives its name from the fact that it was used in determining the speed of the U. S. S. Bancroft:

"This is a combination of measured mile trials with endurance trials. It consists in conducting a series of progressive trials over the measured mile at a series of speeds running from as high as the vessel will make down to any convenient moderate speed, and therefrom determining a curve showing the relation of speed and revolutions. The reason why it is necessary to determine this curve is because, as the speed increases the slip of the propeller increases, so that it requires rather more revolutions to make a knot at high speed than at lower ones. When this curve has been laid out the endurance trial can then take place anywhere, as no landmarks or buoys are necessary. The ship simply goes to sea in water sufficiently deep to insure no retardation due to shoal water, and the four hours' trial is run off. The total number of revolutions made in the four hours divided by 240 gives the average per minute, and from this the average speed for the four hours is at once determined. There are a number of decided advantages inherent in this method. In the first place, the progressive trials on the measured mile enable data to be obtained which are of the greatest service to designers of both hull and machinery, in securing the relation of speed and power through the entire range of the ship's performance. Then the endurance trial requires the service of no ship except the one which is actually being tried. The staff of observers which would be required for determining the engine-room data on any other trial will be the same, and the deck observers will probably not be as numerous as in the trial over a longer course. From the contractors' standpoint there is the important advantage that it can be determined at any moment what the performance of the vessel is, as it is simply necessary to count the revolutions for a minute, when the speed is at once known. When the vessel is tried by the long-course method, the speed is not definitely known until after the trial has been completed and the tidal corrections worked out. There have been some cases where the contractors were subjected to great disappointment because the tidal correction proved much greater in amount than had been anticipated. From knowing at any moment what the performance of the vessel is, the contractors are enabled, if the performance improves steadily, to continue the trial beyond the four hours, and take any consecutive four hours for the vessel's performance. While this might enable them to earn a higher premium, the government is also getting a ship which has been subjected to a more thorough trial than was required. There is still another great advantage to the contractors from the fact that if the trial takes place in a locality not in the line of passing vessels, fog need not interfere with the trial in the least. The speed can be maintained at the same point as was made before the fog set in, as the engine-room counters, on which the determination rests, can, of course, be seen just as readily as when the weather is clear. In case it became necessary to alter the course to avoid passing vessels or for other reasons, this would not operate to the disadvantage of the contractors, as the detour could be made to such a large circle that the helm need be scarcely put over at all, and the revolutions would be maintained the same as before.

"It is probable that this method would have been adopted as the standard method for all our trials, were it not for the fact that some hesitation seems to be felt on the ground that the revolutions are not an absolute criterion of the vessel's speed. This is, of course, true under certain conditions, as, for example, the same number of revolutions, which in absolutely smooth water and without wind, would give a certain speed, would not give so high a speed in a rough sea with a strong head wind; but inasmuch as the measured-mile course can be laid off at sea, where the conditions would be practically identical with those under which the trial would be run, and as no contractor would ever run off a speed trial when the weather was bad, it is evident that this objection is imaginary rather than real.

"Some years ago, when Chief Engineer Isherwood conducted an elaborate series of trials on the tug *Nina*, to test the Kunstadter steering propeller, he used a speed recorder, which consisted of a small propeller connected to a registering device by gearing, and rigidly connected to the ship's side amidships by struts. The propeller used was large enough to be more than the toy which the propeller of the patent log is, and by standardizing it at a moderate speed the indications would be the same for a knot at any speed. The only objection to this method would be the possible increase of resistance, at the high speeds of our modern ships, from the struts and the propeller when made of the size necessary to secure strength."

The Nickel Plate road offers one fare rates to designated Michigan points on May 7th account land seeker's excursion. Write for particulars. May 11—232.

St. Mary's Falls Canal Traffic.

Following is a comparative statement of commerce, east and west bound, through St. Mary's Falls canal for the month of April, seasons of 1894 and 1895:

EAST BOUND.

Items.	Season of 1894.	Season of 1895.
Copper, net tons.....	650	665
Corn, bushels.....	163,300	.....
Building stone, net tons.....	.....	.....
Flour, barrels.....	302,480	36,900
Iron ore, net tons.....	56,501	.....
Iron, pig, net tons.....	.....	.....
Lumber, M. ft. B. M.....	1,159	492
Silver ore, net tons.....	.....	.....
Wheat, bushels.....	921,466	.....
Unclassified freight, net tons.....	6,586	842
Passengers, number.....	48	37

WEST BOUND.

Items.	Season of 1894.	Season of 1895.
Coal, anthracite, net tons.....	27,398	.....
Coal, bituminous, net tons.....	31,052	5,145
Flour, barrels.....	36	.....
Grain, bushels.....	.....	.....
Manufactured iron, net tons.....	133	.....
Salt, barrels.....	3,000	3,150
Unclassified freight, net tons.....	8,311	2,181
Passengers, number.....	108	28

East bound freight, net tons 1895..... 5,992

West bound freight, net tons 1895..... 7,906

Total..... 13,898

Canal opened April 17, 1894, and April 25, 1895.

A Favorable View of the Iron Industry.

M. A. Bradley of Cleveland is one of the few vessel owners who has taken no ore under contract this season. He was in practically the same position last year. As Mr. Bradley controls, individually, more boats than any other owner on the lakes, the stand he has taken during the past two years in the matter of ore contracts is remarkable. He has some boats that are of sufficient capacity to earn more on 80-cent ore contracts than many vessels that have been placed at that figure. He simply takes the stand, however, that there is not enough in the 80-cent rate to warrant tying up to it, and he intends to be in a position to take full advantage of the rise in freights when it comes. With him there is no question about better freights coming; maybe not this fall, he says, but if not the change is certain to come next season.

Of course, this is simply the opinion of one large owner of vessel property, whose control over a fleet of ships is sufficient to permit of his doing just as he pleases with them. It is an opinion, however, that is very well supported by conditions prevailing in the iron industry. Buyers are losing the conservatism which has so long governed their actions and are prepared to purchase for future delivery. Some labor difficulties are on hand and new ones are expected, but it is not at all probable that they will be as long drawn out as in the past. Buyers are finding that they are actually called upon to pay an advance in several lines. Raw materials are all unmistakably dearer and consumption has increased so that there must be an advance all along the line in finished products. The following paragraph from an editorial in the current issue of the Iron Age is indicative of the feeling among those who keep posted on the market:

"There is, of course, important branches of the iron and steel trades in which consumers are always obliged to cover their requirements for a reasonable time. They must take the chances of a decline even if they are painfully aware of the danger that prices may go lower. But a far greater number of buyers, especially merchants, are not compelled to purchase heavily and will only do so when they foresee a very large demand or anticipate a stiffening in prices. These classes of buyers are now being influenced by the improvement in primary markets and are ready to take a radical departure from hand-to-mouth business as soon as they see some further indications of the rising breeze which is again to fill their sails for a trip over prosperous seas. It will perhaps be well for the country if they are not simultaneously possessed of the idea that this is a good time to stock up. If this should happen, and the thousands of merchants should begin to order larger stocks, and the many more thousands of consumers should conclude to cover their wants well into the future, it is not difficult to foretell what would happen. The supply would fall far short of the suddenly enlarged demand and prices would mount skyward, only to drop again as soon as the stimulated production would catch up with the demand. The possibility of a greatly increased business in iron and steel is by no means remote. The disposition to spec-

ulate is only dormant and not destroyed. This is shown by the recent movement in oil, which demonstrated how easily money can be attracted from the people when they see an opportunity to make more money. There is a vast reserve of wealth to be drawn upon for investment in other directions as opportunities present themselves. The ease with which subscriptions for \$1,000,000 worth of stock in the Johnson company was recently secured in Cleveland is another illustration. All sorts of capitalists, large and small, are anxiously waiting for a chance to make their idle money begin to earn something for them. Let a well defined buying movement of broad sweep make an impression on the current of trade and they would be drawn into it."

Bids on Dredging Jobs.

The large increase in the number of dredging plants owned throughout the lakes has certainly resulted in very low prices being made on dredging work of all kinds, even in cases where the amount of work to be done is limited. Following is an abstract of proposals for dredging Cheboygan harbor, Saginaw river above Bay City, and the bar at the mouth of Saginaw river, opened on the 2d inst. by Lieut. Colonel G. J. Lydecker, corps of engineers, U. S. A., Detroit, Mich. In all cases prices are in cents per cubic yard:

Name and Address.	Cheboygan harbor.	Saginaw river above Bay City.	Bar at mouth of Saginaw river.
Charles H. Hubbell, East Tawas, Mich.....	.....	.45	.35
Hingston & Woods, Buffalo, N. Y....	.24	.30	.44
Carkin, Stickney & Cram, East Saginaw, Mich.....	.35	.34	.33
Christopher H. Starke, Milwaukee, Wis.....	.14	.....	.35
Racine Dredge Co., Racine, Wis.....	.....	.....	.41
C. E. Mitchell & Co., Ludington, Mich.....	.12 ³ / ₁₀	.....	....
Bay City Dredging Co., Bay City, Mich.....	.....	.33 ¹ / ₃	.50
Edmund Hall, Detroit, Mich.....	.....	.....	.23

Delivery of Mail at Detroit.

About the time that ex-Postmaster General Bissell left the cabinet, arrangements were being made in the post office department to take up, with J. W. Westcott or others of Detroit, the matter of a government contract for carrying mail to and from all vessels passing Detroit. Mr. Bissell had taken a personal interest in the subject, but upon his resignation from office it was allowed to drop. C. F. Swan, superintendent of the city division of the Detroit post office, had also taken the matter up, and secured an indorsement of it, some time ago, in a conference of free delivery superintendents at Washington. Now the proposition is again being discussed in Detroit and it has the support of Postmaster Enright, who suggests that the delivery be taken up on a broader scale than it is now conducted by the private enterprise of J. W. Westcott, who was the originator of it. Mr. Enright's idea is to use a fast steam launch, so that passing boats would not be compelled to slow down materially, excepting in rough weather, when it would be necessary to employ a strong row boat as at present. He says that the delivery of telegrams might also be included in the government service, as arrangements for having a special delivery stamp attached to them might be made with the telegraph companies, and their delivery would then be immediate. If this work should be undertaken by the government, the result would undoubtedly be a very heavy increase in the amount of mail matter passing to and from vessels. The delivery of telegraphic orders, as at present conducted by J. W. Westcott, is attended to with a kind of unwritten guarantee of promptness and certainty. This could not as well be expected of the postal service, and it would seem therefore that if the benefits of general delivery at Detroit are ever to be realized, through the government taking hold of the work, all interests would be best served by a contract being made with Westcott to conduct the general delivery, leaving the special private business to care for itself as in the past.

According to latest reports regarding the yacht Defender, the hull up to the water line will be composed of seventy plates, hot rolled, of manganese bronze made by the Cramps, weighing altogether 20,000 pounds, varying in size from 6 to 22 feet in length, from 3 to 5 feet in width, about a quarter of an inch thick, and to be fastened together with 20,000 half-inch pan-head rivets of the same metal. Her sail area is calculated to be 19,101 square feet, with a mast 102 feet long, a boom of the same length and a bowsprit 44 feet long.

In a letter to a friend in Cleveland, Col. William Ludlow, who is the senior officer of the Nicaragua canal board, appointed by the president to make a survey of the canal route for the United States government, says that upon boarding the U. S. S. Montgomery at Mobile on Tuesday of this week the engineering party expects to go direct to Greytown. About two and a half months will be spent, he thinks, on the work.

All England Discussing Boilers.

Marine engineers throughout Great Britain are talking of nothing but water tube boilers these days. The portrait herewith is that of



William Allan, a builder of marine machinery and a member of parliament who a few weeks ago brought on the boiler discussion by a sensational and not altogether temperate attack on the British admiralty for ordering Belleville boilers in two of the largest naval vessels. Since the delivery of Mr. Allan's famous speech, the London Times, as well as all of the leading engineering journals of Great Britain, have been filled with communications relative to the boiler question. The Times in a

late issue refuses to take to either side in the controversy, but concludes a lengthy summary of the correspondence with the following editorial comment:

We are not concerned at this stage of the matter to take a side in this important controversy. Many questions are involved, most of them highly technical, and such questions, in default of extended experience, which alone can finally decide the issue, are best left to the free discussion of competent experts. It should, however, be noted by such outsiders as attempt to form an independent judgment on the issues involved that the factor of self-interest, so far as it affects the controversy, is more or less involved on both sides. If the advocates of the water-tube boiler are supposed to be interested in particular boilers of that class, it is not to be forgotten that the advocates of the cylindrical boiler represent an important trade in which a large amount of capital is invested. Hence if we make allowance for self-interest on one side we must not neglect it on the other. We are far from saying that persons interested in one type of boiler or the other are incapable of forming an independent and disinterested judgment on the comparative merits of the two. But, broadly speaking, self-interest is a factor common to both sides of the controversy, and its influence, conscious or unconscious, on one side is balanced by a corresponding influence on the other. The essential question is, however, not whether the water tube boiler is likely to become the marine boiler of the future for all steamships, but whether, so far as an intelligent outsider may judge, the admiralty have been well advised in adopting a particular type of water tube boiler—the Belleville—for the large war ships now building and projected. The principle of the water tube boiler is simple and easily understood. The ordinary boiler contains water which is heated by means of tubes passing through the volume of the water, and these tubes form the ducts or passages for the flame given off by the fire underneath. The water tube boiler, on the other hand, consists of tubes so arranged that they contain water which is to be converted into steam, and the flame from the fire underneath plays upon the outsides of the tubes. The arrangement of the tubes is a matter of detail and differs greatly in water tube boilers of different types.

Now it is claimed by those who advocate the employment of water-tube boilers for large sea-going steamers that it is by their use alone that further advance can be looked for in the reduction of boiler weight per unit of power and in the safe increase of steam pressures and consequent increase of ocean speeds; that they raise steam far more quickly than cylindrical boilers of equivalent power; that they are capable of being fitted and taken to pieces in detail without interfering with the structure of the ship in which they are placed; that they are more easily and largely susceptible of minor repairs *in situ* and even at sea; that they are far less liable to serious injury from projectiles, large or small; and that, owing to the subdivision of their water-heating elements, they are practically inexplosible, or that in any case the explosion of one or more of their tubes would not and could not be so disastrous in material and moral effect as the explosion of a boiler of the cylindrical type. It must be manifest to everyone that, if these advantages are found to belong to any water tube boiler adapted for use in large sea-going ships, such advantages are precisely those which would be regarded by every naval officer as almost ideally desirable. The cylindrical boiler lacks every one of these advantages in a greater or less degree. It may be that for a given horse power some types of water tube boilers weigh more and require more space than the cylindrical, and in coal consumption are somewhat less economical. That may be a very good reason for not adopting them in the mercantile marine, though, as our columns have shown, many high authorities maintain the superiority of the water tube boiler in these respects also. But this is in itself no reason at all for not adopting the water tube boiler in war ships. The advantages above enumerated, if attainable, far outweigh the alleged but by no means established disadvantages of increased size, weight and consumption of fuel. So far, then, the policy of the admiralty would appear to be justified, even if the weight of opinion in the mercantile marine is still opposed to the use of the water tube boiler.

"It can not be denied that the decision of the admiralty in adopting the Belleville boiler is a very bold one. "We have no experience of the performance of water tube boilers in large war ships in our own or other navies. Such experience as exists is derived from merchant steamships, and as everyone knows, there are many and most important differences between the two. The adoption of the Belleville boiler for large war ships is, therefore, if not a leap in the dark, a leap in the light only of theory and of experience limited to conditions very different from those of war ship efficiency. We do not say that it is an unwise leap on that account. After all, it is a question of confidence in the technical advisers of the admiralty. They, at any rate, are not influenced, consciously, by self-interest in the matter. Their responsibility is heavy, and it has been openly and deliberately assumed. If the boilers of the Powerful and Terrible should prove failures the country will hold them to a proportionately heavy reckoning. We must assume that they have weighed the technical and practical objections urged against water tube boilers and found them wanting. We must assume that, like the French and Russian naval authorities, they have thoroughly satisfied themselves of the special and unique advantages of water tube boilers for use in war ships—so thoroughly indeed as to entertain no misgiving as to the wisdom of the experiment they have recommended. On this hypothesis they have deserved well of the navy and the country. On any other it will have to be said of them hereafter, as one of our correspondents has already said quite prematurely, that 'nothing more unjustifiable has ever been attempted since we have had a steam navy.'"

A Canadian Passenger Boat.

The Great Northern Transit Company's steamer Majestic, launched recently by the Collingwood Dry Dock Company of Collingwood, Ont., will rank among the best wooden passenger boats owned in Canada. The machinery was built by John Ingall & Son of Toronto. Dimensions of the Majestic are: Length 227 feet, beam 35 feet 10 inches and depth of hold 13 feet 4 inches. Her tonnage is 1,600. She is built of white oak, with a main deck of British Columbia Douglas fir. About sixty-five tons of $\frac{3}{4}$ -inch steel was used in arches and strapping, and iron bolts with other metal entering into the hull weighs about fifty-five tons. The promenade deck is 200 feet by 19 feet, and the cabins contain 120 state rooms in addition to quarters for officers and crew. A steam capstan forward and another amidships, as well as steam steering gear and steam windlass are features of her equipment. The engine is a fore-and-aft compound, with cylinders 28 and 54 inches by 46 inches stroke. Two square fire-box boilers will furnish steam at 136 pounds pressure. The electric light plant consists of one 30-horse power engine and an Edison dynamo of the latest design, carrying 275 16-candle-power lamps.

Collector of Customs Austin of Toledo is worried over the fact that vessels clearing light from lower Lake Erie ports drop into Toledo and after taking on coal cargoes for the upper lakes depart without making a report of them. Of course they do, and the same thing happens at other ports as well as Toledo. Mr. Austin must be new in the customs business. He will learn later on that this practice is permitted by defective customs laws, that not only deprive Toledo of a full share of credit in the lake business but actually prevent the collection of reliable statistics regarding any part of the commerce of the lakes, excepting the business of the St. Mary's Falls canal, which is looked after by the war department, and iron ore shipments, which are readily accounted for through officers of the railway companies. Repeated efforts have been made, so far without success, to amend these defective custom laws. Any effort that Mr. Austin may make in this direction will be commended by a great many people in the vessel business who are anxious to secure reliable statistics of lake commerce through the customs service. Opposition comes from managers of a few package freight and passenger lines that have boats trading at numerous intermediate ports on different lake and river routes.

Repairs to vessels involving an expense of \$20,000 or more will be required on account of strandings in Hay lake channel, due to the absence of proper buoys at one point in the channel. In the absence of a full understanding of the facts it would be unfair to charge the inspector of the district with negligence in this matter, but it is a fact that the light-house institution has had at its command for nearly two years a large appropriation for lighting and marking this channel and the delay that has attended a completion of the work has been decidedly annoying to the vessel interests. It is even now doubtful whether the channel will be properly marked and lighted before the close of the present season, although it has been used since July last by practically all vessels engaged in Lake Superior commerce, which amounted to more than 13,000-000 tons in 1894.

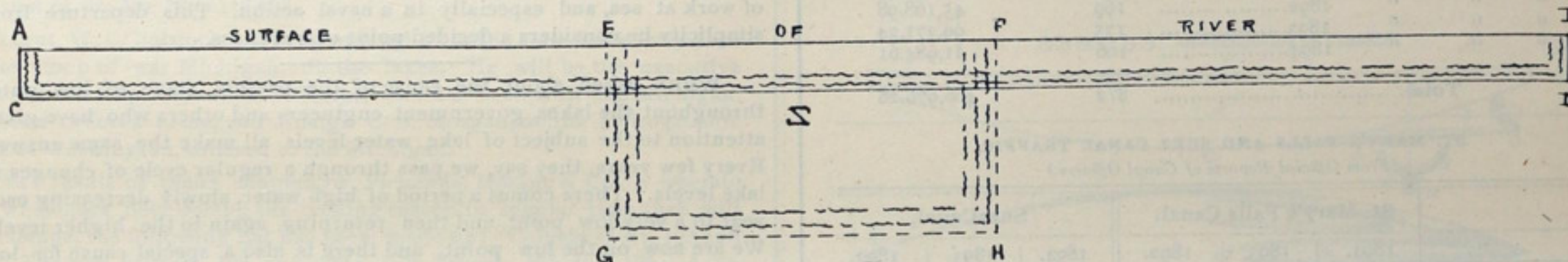
Preparations are being made for the construction of a new merchandise dock on Allouez bay, Superior. It is said that the dock will be 1,900 feet long by 380 feet wide, and will have a roof 250 feet long by 19 feet wide.

Performance of the Unique.

The McElroy steamer *Unique*, which is to engage in passenger service between Detroit and Port Huron, made her first trip from Detroit to Port Huron Monday and returned Tuesday morning. It was the first run which might be called successful. A correspondent, who was aboard the boat, writes that the new boilers worked well and there was apparently no tendency to deliver water to the engines. The water level was remarkably steady. The engines worked well at 200 revolutions per minute, and everybody connected with the boat now feels confident of obtaining good results from both boilers and engines. The running time, deducting stops, was about 3 hours and 15 minutes. The last seven miles was traveled in 19 minutes and 50 seconds. There were on board the following gentlemen connected with the firms supplying the motive power: Mr. R. S. Stikeman, engineer of marine department, Mr. C. J. Wolfenden of the Chicago office, and Mr. Charles Wilson, sales manager of marine department, all of the Babcock & Wilcox Co., builders of the boilers, and Messrs. Symington and Penton of the Frontier Iron Works, the builders of the engines. The boat will continue in regular business henceforth. The REVIEW expects, later on, to give information in detail regarding this steamer's performance, as she is fitted with quadruple expansion engines and water tube boilers.

Is Flow of Water Increased by Dredging?

Editor of MARINE REVIEW: In the last issue of the REVIEW, Mr. Kallman, assistant United States engineer, differs with me as to the probable lowering of the lake levels by reason of deepening the Lime-Kiln crossing in the Detroit river. However, he does not convince me that I am wrong in stating that the flow of water is increased by dredging. I should like to ask Mr. Kallman, through your paper, if in the accompany-



ing sketches, (used simply to illustrate my point,) the area of the cross sections being the same, would the flow necessarily be the same. I hold that the flow would be greatly increased, for the reason that at the point Z the water would have freer movement and consequently accelerated motion. Then, also, in the figure E. F. G. H. the friction would be over one-half less than in A. B. C. D.

It appears to me that for these reasons the Lime-Kiln crossing is, and has been for some time, lowering the stage of water on these lakes, and the sooner this question is faced and the facts found out and corrected by a dam at Niagara or otherwise, the better for all concerned.

RICHARD P. JOY,

DETROIT, MICH., May 7, 1895.

Mammoth Lock Gates for Sault Canal.

Few people recognize the magnitude of the work connected with the construction of the steel gates of the new government locks at Sault Ste. Marie, which was started last fall. The Detroit Bridge and Iron Works has the contract. At the start it was necessary to build an unloading traveler, for the purpose of hoisting the immense sections of the gates from the railway cars. This is located north of the swing bridge on the canal. Next came the building of the erection traveler, which is used in lowering the sections of the gates into position. The construction plant alone cost over \$10,000. It is expected that the gates will be finished early in July, work on four of them being at present practically completed, and the fifth and last having been commenced this week.

The gates are designated as the upper guard and the upper lock gate, the intermediate lock, the lower lock and the lower guard gate. The upper lock and the guard gates are 26 feet, 6 inches in height. The gates are all of the uniform length of a trifle over 55 feet. They are the largest gates of steel in the world. Each leaf has two air pumps and two air chambers, situated near the bottom of the gates, and two water chambers a few feet above the center. The air pumps will be operated by hand from the top of the gates. The air and water chambers are used in conjunction to preserve the equilibrium of the gates, and to prevent any undue strain on the quoin posts. The top of the gates will be provided with a wooden walk, which will have gas pipe railings on either side, for the convenience of foot passengers.

The method of erecting the gates is interesting. In the first place the quoin post of the gate is lowered by the construction traveler to the

bottom of the chamber. It is then up-ended and placed in position on the petel, a heavy plate of steel, from the center of which is raised a hemisphere, over which the center of the quoin post sets. The petel rests unfastened on a steel plate, imbedded in concrete. The quoin post is anchored at the top, and section by section the different parts are lowered and riveted together with bolts and fastened to the quoin post, which might be termed the hinge of the gate. The sections weigh ten and twenty tons each. The anchor boxes are of forged steel, and weigh about eight tons, and to them the quoin posts are fastened at the top, the boxes having previously been placed solidly in position.—Sault Ste. Marie News.

Miscellaneous Mention.

A pamphlet of a dozen pages devoted to information relative to the display of wind signals, and places on the lakes where signals and storm warning messages are displayed, has just been issued by the weather bureau. Copies of it may be had from officers of the service in the several lake cities.

The North Sea and Baltic canal will be entirely lighted by electricity. Groups of twenty-five incandescent lamps will be installed along each bank at intervals of 250 metres, making in all about 25,000 lamps. Besides this, each lock will be lighted by twelve arc lamps, and there will be electric lamps for the signals.

Mr. Robert R. Rhodes' big freight steamer *Yale* will probably be launched from the yard of the Cleveland Ship Building Company with something out of the ordinary in the way of festivities when she is ready to go into the water. There are certainly enough *Yale* men in Cleveland to make the christening of this ship a memorable event.

As it is not probable that the Northern line passenger steamer *North*

Land will be ready for service much in advance of the time fixed for her to enter upon regular trips in June, the excursions of trunk line officials from Buffalo to Chicago and from Chicago to Lake Superior during the first week of June will have to be carried out on the *North West*. Before departing for Chicago and Lake Superior, the *North West* will, however, give to a large number of railway passenger agents an excursion from Buffalo to Cleveland and return.

Lieut. W. H. Beehler, U. S. N., who is the inventor of the solarometer, a navigation instrument by means of which compass errors may be determined, promises to send one of these instruments to the lakes for trial during the coming summer. The great benefit of the solarometer in ocean navigation is that it will determine a ship's latitude and longitude by observation of the sun and stars at all hours of day and night, independent of the visibility of the sea horizon. On the lakes it would, of course, be of no value in this regard, but it would undoubtedly be found valuable in correcting compass errors.

At all of the ore shipping ports excepting Escanaba the charge for trimming ore cargoes is now 2½ cents. The difficulties with trimmers at Marquette have been partly overcome by representatives of the railway looking after the matter of providing men for the work. At Escanaba, the contractor who had the endorsement of leading vessel firms has been unable to find men to do the work at less than 3 cents, and as a result a large number of vessels have been leaving port without trimming the cargoes. The Minnesota Iron Company has also moved some of its vessels out of Two Harbors without trimming their cargoes. This can be done under favorable conditions, and it would seem now that the uniform rate of 2½ cents for trimming at all ports, with the possible exception of Escanaba, will be established for the season.

The second big steamer to be built by F. W. Wheeler & Co. for Eddy Bros. and Capt. John Shaw of Bay City will be 14 feet longer than the *J. J. McWilliams*, also built by Wheeler & Co., and which is now bound down from Ashland with the first cargo, 2,929 gross tons of ore. This is probably the largest cargo thus far brought from Lake Superior this season. Wheeler & Co. take the *C. A. Eddy* in part payment for the new boat. Engines and boilers will be the same as those in the boat already building for Eddy Bros. & Shaw, this power being somewhat greater than that of the *McWilliams*. Principal dimensions of the boat, according to present plans, are 366 feet keel, 45 feet beam and 27 feet hold. There will be no gangways in the boat, as she is not intended for package freight business.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Net Tonnage.
1890.....	218	108,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
Total.....	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

AS a result of repeated solicitation from the Lake Carriers' Association and the leading commercial organizations of Chicago, Cleveland and Buffalo, the war department has finally appointed a commission of engineers, consisting of Gen. O. M. Poe, of Chicago, Major E. H. Ruffner, of Buffalo and Capt. William L. Marshall of Chicago, to meet at Chicago and report on "the probable effect of the operation of the Chicago drainage canal upon lake and harbor levels and upon the navigation of the great lakes and their connecting waterways." In the last congress an effort was made to secure the appointment of a commission of engineers, not entirely from the army corps, to enter into a general investigation of the subject of lake levels, with a view to determining certain matters relative to the effect of river and harbor improvements already made as well as the probable effect of dams that have several times been proposed for different points on the lakes. It was the intention to secure, through the passage of the measure introduced in the last congress, a report from competent engineers on the whole lake outflow question. Gen. Casey, chief of engineers of the war department, opposed the passage of this bill, which was defeated, and he was reported as saying that the outflow to the Chicago canal, when it is completed, would have no material effect on lake levels, although Major Ruffner, a member of the engineer corps who some time ago reported on the outflow at Niagara, has been repeatedly quoted as saying that the opening of the Chicago canal would probably lower the level of the lakes about 8½ inches. Under the pressure of requests from lake cities, Gen. Casey has, however, appointed this commission, and Major Ruffner has been made a member of it. It is to be hoped that the commission will proceed with its investigation on broad lines, taking in if possible all matters pertaining to the lake outflow and the several questions that have been raised about the effect of river improvements on the draft of vessels using the connecting channels of the lakes. If this is not done, the complaint that is now made—in some cases by engineers of well-known ability—against the policy of the department regarding these works will be increased rather than diminished. The commission is to meet at the call Gen. Poe of Detroit.

If the engineers conduct their investigation in accordance with the requests of the several commercial bodies that have petitioned the war

department they will determine: First, what volume may be safely drawn from the lakes in aid of the low water improvement of the Mississippi river, and what works will be required, if any, to enable the maximum volume feasible to be turned in that direction; second, what works should be undertaken, if any, to maintain the level of the several lakes and the depths in the several harbors of the same in connection with channels adequate in depth and width for ocean navigation through the connecting shallows and to the Atlantic seaboard, and third, how far it may be feasible to maintain and control the levels of Lakes Erie and Ontario at or near high water mark, and to use Lake Superior as a reservoir to feed the other lakes at or near low water.

AT THE last meeting of the Society of Naval Architects and Marine Engineers in New York, Naval Constructor Stahl, who is one of the young men of our navy, and who superintended the construction of two or three vessels on the Pacific coast, raised the point, in general discussion about new vessels of war, that in fitting them for service we are not depending on the human machine. "This thing of touching a button and depending so much upon automatic devices," he said, "is not what is wanted in a fight." Mr. Stahl took a very bold stand against Edwin Cramp and other naval architects in argument against complicated machinery. Now comes Capt. S. Eardley-Wilmot of the British navy, a thoughtful and well-informed writer on naval matters, who earnestly endorses this opinion. In an article recently contributed to the European edition of the New York Herald, Capt. Wilmot indulges in considerable praise for a navy built up wholly within the United States in a few years, but the principal criticism that he makes has reference to the disposition in our navy to replace manual labor by machinery in every possible way. This results, he says, in the multiplication of complicated machinery, liable to be deranged by comparatively slight causes under the severe conditions of work at sea, and especially in a naval action. This departure from simplicity he considers a decided point of weakness.

WHEN asked about the cause of the present stage of low water throughout the lakes, government engineers and others who have given attention to the subject of lake water levels all make the same answer. Every few years, they say, we pass through a regular cycle of changes in lake levels. There comes a period of high water, slowly decreasing each year to a very low point, and then returning again to the higher levels. We are now on the low point, and there is also a special cause for low water at this particular time. Gen. Poe is quoted as saying that since Feb. 1 the rainfall throughout the lakes has been 4 inches short of the normal quantity, while the natural evaporation and outflow has, of course, gone on without change. Observations taken at Quincy show that the Mississippi has now reached the lowest level that it has touched in years. The Mississippi flow always corresponds to the lake conditions, both being governed by the amount of rainfall through the interior regions from whose drainage they gain their volume of water.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on May 4, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago	21,727,000	3,838,000
Duluth	12,408,000	.....
Milwaukee.....	547,000	.....
Detroit.....	567,000	157,000
Toledo	897,000	413,000
Buffalo	1,871,000	775,000
Total.....	38,017,000	5,183,000

It is not probable that the management of the Cleveland & Buffalo Transit Co. will accept the proposition to give the name Greater Cleveland to the big new passenger steamer that is to be built by the Detroit Dry Dock Company. Among Buffalo people there is considerable pride attached to the term Greater Buffalo, and the aim of the transit company is to make friends in both cities. Anyhow, there is nothing lasting about Greater Cleveland or Greater Buffalo, and the terms, which are prompted by special efforts towards progress in the two cities, may be forgotten when the boat has been in service only a few years.

LISTS OF MASTERS AND ENGINEERS OF LAKE VESSELS, TOGETHER WITH NAMES AND ADDRESSES OF MORE THAN A HUNDRED FIRMS AND CORPORATIONS CONTROLLING LINES OF FREIGHT AND PASSENGER STEAMERS ON THE LAKES, MAY BE HAD IN PAMPHLET FORM FROM THE MARINE REVIEW, NO. 516 PERRY-PAYNE BUILDING, CLEVELAND, FOR 25 CENTS.

"AROUND THE LAKES" IS THE TITLE OF A BOOK CONTAINING A LIST OF ALL LAKE VESSELS WITH POST OFFICE ADDRESS OF MANAGING OWNERS. ILLUSTRATIONS ALL HIGH-CLASS PHOTO-ENGRAVINGS. SOLD BY THE MARINE REVIEW AT \$2.

Around the Lakes.

John T. Moore is Chicago's new harbormaster.

Shipments of hard coal out of Buffalo during April, 1894, amounted to 102,997 tons; for the same month this year they foot up only 27,640 tons.

Capt. Samuel Lewis, last season in whaleback 109, and Geo. Holdridge, last season in the 132, are the men selected to sail the oil tank barges building at West Superior for the Standard Oil Company.

Delay in receiving necessary material for the steel canal boats being built by the Globe company, Cleveland, for service between Cleveland and New York may prevent a satisfactory trial of the experiment being made this season.

The steamer Arrow, built by the Detroit Dry Dock Company for the Sandusky and Island Transportation Company, is numbered 107,155 on the books of the bureau of navigation, and her tonnage is 365.15 tons gross and 182.58 net.

About May 10, a fixed red lantern light will be established 25 feet above lake level on a post in line with the two pierhead lights and at the east extremity of the boom piling on the north side of the inner entrance to Muskegon lake east of Lake Michigan.

It is to be hoped that there is no truth in the report that the boat being built by F. W. Wheeler & Co. of West Bay City for the Stephenson Lumber Co. is to be named I. Watson Stephenson. Sailormen would certainly fight shy of a craft having a name parted in the middle.

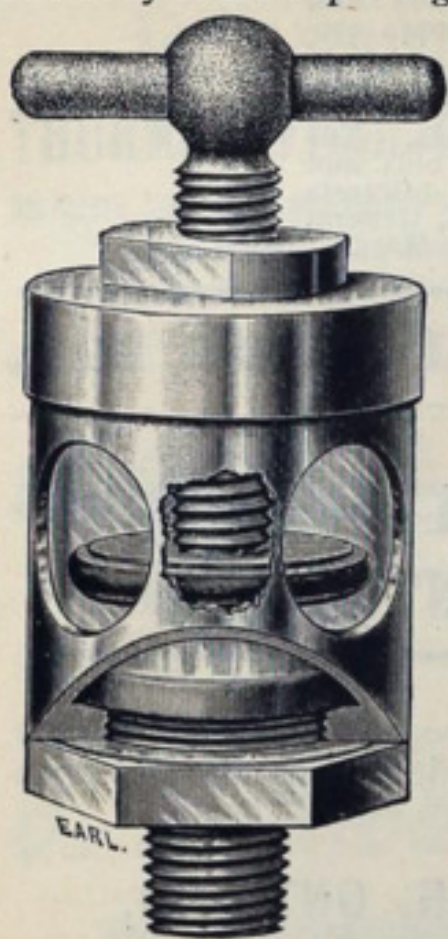
The two oil tank barges being built by the American Steel Barge Company for the Standard Oil Company will be known as S. O. Co. No. 75 and S. O. Co. No. 76. The tonnage is the same in both cases, 793.82 tons gross and 780.22 net. The official number of the No. 75 is 116,666 and that of the No. 76 is 116,667.

Lieut. W. C. Babcock has been ordered from the New York navy yard to the sloop of war Michigan, on the lakes. He will be the executive officer of the ship. Lieut. C. P. Reese, who has been with the Michigan, has been ordered home, and Ensign C. B. Morgan, of the hydrographic office at Washington, ordered to the Michigan.

As a result of plans adopted by Pickands, Mather & Co. to operate the whaleback fleet during the coming season in regular tows that will not change, the following list has been made up: Colgate Hoyt, 102 and 104; Thomas Wilson, 109 and 129; J. B. Trevor, 105 and 126; A. D. Thompson, 111 and 127; Samuel Mather, 107 and 118; J. B. Colgate, 115 and 116; E. B. Bartlett, 101 and 103; H. H. Brown, 134; E. M. Peck, 117; Yakima, 133; Wallula, 131; John Mitchell, 130; M. B. Grover, 132.

A New Grease Cup.

There is illustrated herewith a new grease cup, which has recently been placed on the market by the Penberthy Injector Co. of Detroit. The body of the cup is a glass cylinder, surrounded and protected by an



outer brass shell with openings on four sides, through which can be told at a glance the amount of grease or dope in the cup. The plunger by which the grease is forced out from the bottom of the cup is made of a heavy rubber washer, protected on both sides by a brass disk, the whole being attached to the bottom of the stem in such a manner that the stem revolves without turning the washer or disks, and at the same time no grease can pass up through the center of the washer. The cover never needs to be removed from the cup, as the body of the cup is screwed onto the shank and is removed from the shank to be refilled, therefore there is no chance for any of the parts to be lost or mislaid when the cup is being filled. This cup is meeting with a very rapid sale, and although only placed on the market the first of January the manufacturers say they have been unable to keep up with their orders. Circular and price

list relative to this cup will be sent upon application to the above company.

The rearrangement of the dining cars on the Nickel Plate road provides breakfast and dinner on the New York and Boston express No. 2 eastbound, breakfast and dinner on the fast western express No. 5, and dinner on No. 6. This newly established service not only accommodates the through passengers of that line more satisfactorily, but provides a better arrangement for its local patrons.

May 11—234.

COPIES OF THE LATEST CHARTS OF GEORGIAN BAY HARBORS MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING.

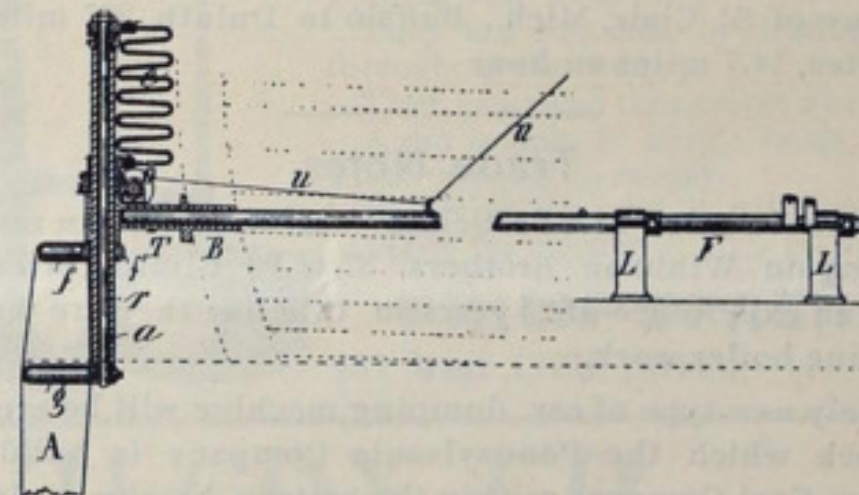
Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

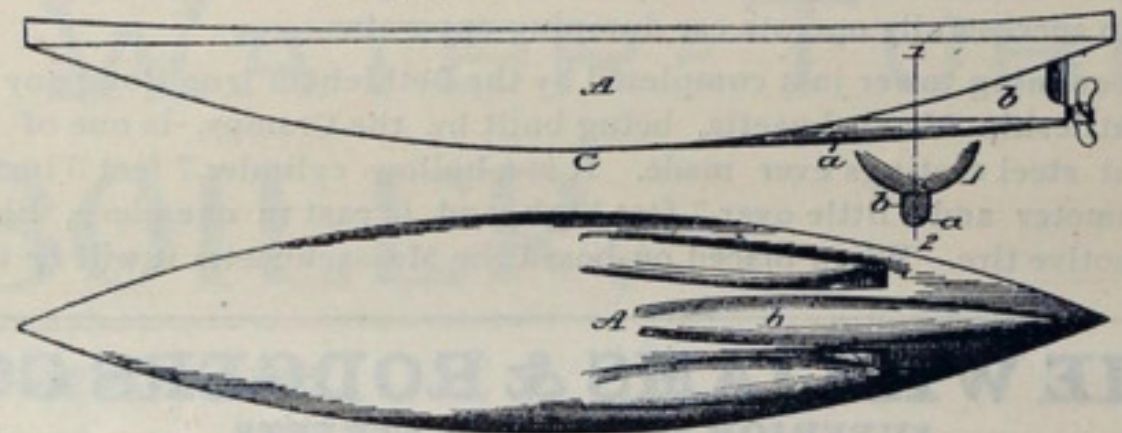
538,303. **Steering and Propelling Apparatus for Vessels.** Henry C. Vogt, Copenhagen, Denmark. Filed Oct. 2, 1894. Serial No. 524,721.

Claim—In steering and propelling apparatus for vessels, the combination with a rudder-blade, the post thereof, and an oscillatory shaft extending at a right angle to the post and supporting the rudder-blade like a pendulum, of a worm-wheel, means for supporting the same, a worm gearing with the worm-wheel, a spring between the worm-wheel and the post, and means for rotating the worm, said worm being adapted to adjust the rudder-blade during the motion of the vessel toward the axis of the same, the whole area of the rudder being to one side of the axis or post of the rudder-blade, in order to produce the steering of the vessel.

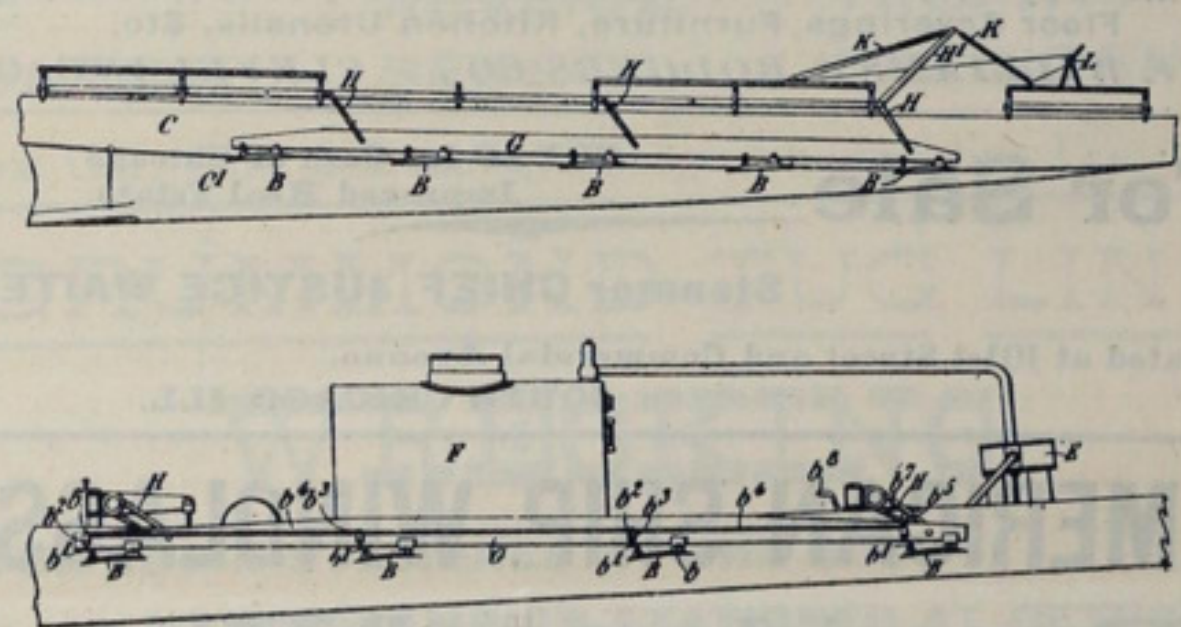
538,303. STEERING AND PROPELLING APPARATUS FOR VESSELS.



538,353. CONSTRUCTION OF VESSELS



538,527. BOAT OR VESSEL.



538,353. **Construction of Vessels.** George W. Schermerhorn, Philadelphia, Pa. Filed Dec. 4, 1894. Serial No. 530,827.

Claim—The combination with a vessel whose hull beneath the water line is of the form of a section of a spindle, of two or more runs, the under parts of which have the form of a section of a spindle and the upper parts of which are formed of dead woods which unite said lower parts to the hull of said vessel, each of said runs being so placed that a plane passing longitudinally upward through its center will pass longitudinally through the longitudinal axis of the spindle shaped part of the vessel.

538,527. **Boat or Vessel.** Charles A. de Lambert, Versailles, France. Filed Oct. 1, 1894. Serial No. 524,628. (No model.) Patented in France, Aug. 13, 1891, No. 215,498.

Claim—The combination with a boat, of the swinging arms H having a pivotal connection with the boat and depending therefrom on each side, the beams G suspended from said arms and extended along opposite sides of the boat, a series of adjustable blades or vanes pivoted to said beams and arranged one behind the other, means for adjusting the inclination of said blades, and mechanism for raising and lowering the swinging arms, substantially as shown and described.

Cargo and Speed Records—Lake Freight Steamers.

Iron ore—S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 4,569 gross or 5,117 net tons, Escanaba to South Chicago; Maritana, Minnesota Steamship Company of Cleveland, 4,260 gross or 4,771 net tons, Escanaba to South Chicago; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 3,897 gross or 4,364 net tons, Escanaba to Ashtabula; Kearsarge, Interlake Company of Cleveland, 3,718 gross or 4,164 net tons, Escanaba to Cleveland.

Grain—Selwyn Eddy, Eddy Transportation Company of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; Centurion, Hopkins Steamship Company of St. Clair, Mich., 152,000 bushels of corn, Chicago to Buffalo; S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 246,673 bushels of oats, Chicago to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Company of St. Clair, Mich., Buffalo to Duluth, 997 miles, 67 hours and 50 minutes, 14.7 miles an hour.

Trade Notes.

Any person in want of a first-class marine boiler can make no mistake in calling on Wildman Brothers, 87 to 93 Clinton street, Chicago, Ill., for with an experience of 25 years in this line they are positively experts in marine boiler work.

An entirely new type of car dumping machine will be erected on the new coal dock which the Pennsylvania Company is building for the Cuddy-Mullen Coal Company within the eastern breakwater enclosure at Cleveland. The machine is to dump sidewise and will be built by the McMyler Manufacturing Company of Cleveland, which was the first concern to successfully operate car dumping apparatus.

A conning tower just completed by the Bethlehem Iron Company for the battleship Massachusetts, being built by the Cramps, is one of the largest steel castings ever made. It is a hollow cylinder 7 feet 3 inches in diameter and a little over 7 feet high, and is cast in one piece, like a locomotive tire. When placed on board the Massachusetts it will be top-

THE WILLIAMS & RODGERS CO.

SUPERIOR and SENECA STREETS,

BOAT SUPPLIES

We make special rates to vessel owners on Dry Goods, Bedding, Floor Coverings, Furniture, Kitchen Utensils, Etc.

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For Sale

CHEAP for Cash or Chicago
Improved Real Estate.

Steamer CHIEF JUSTICE WAITE,

Located at 101st Street and Commercial Avenue,

SOUTH CHICAGO, ILL.

ped by the wooden pilot house, from which the ship is steered when not in action.

A search light recently purchased from the General Electric Company by Lynn Bros., marine reporters of Port Huron, will be used to discern the names of vessels passing Port Huron at times when the weather is such that reporters, not having special messages for the boats, do not go out to them. The Port Huron firm has a contract with the United News Association to furnish the names of all passing vessels for newspapers, and the light will be especially serviceable in this work.

MARINE ART VIEWS: SIX HANDSOME PHOTO-CHROMOTYPES, OF 5 BY 8 AND 6 BY 9 INCHES PICTURE SIZE, AND 9 BY 12 INCHES PAPER SIZE; MOST ATTRACTIVE MARINE PICTURES PUBLISHED—

NIGHT SCENE, U. S. CRUISER MINNEAPOLIS,
LARGEST STEAMER ON THE LAKES, ZENITH CITY,
I. W. NICHOLAS, DUPLICATE OF THE CHILI,
TEN DETROIT-BUILT STEAMERS, GROUPED,
THE NORTH LAND—EVENING SCENE,
THE W. H. GRATWICK—HEAVY WEATHER COMING.

THE SIX WILL BE SENT IN A TUBE FOR \$1;

ANY ONE WILL BE SENT FOR 25 CENTS;

MONEY RETURNED IF PICTURES ARE NOT SATISFACTORY.

MARINE REVIEW,
516 PERRY-PAYNE BLDG.,
CLEVELAND, O.

U. S. ENGINEER OFFICE, 34 WEST CON-
gress St., Detroit, Mich., May 8, 1895.
Sealed proposals for furnishing all labor, ma-
terials and appliances, and removing material
from moveable dam and from 800-foot lock ap-
proaches, also for constructing piers for lock
approaches, will be received here until 2 P. M.,
June 7, 1895, and then publicly opened. All in-
formation furnished on application. O. M.
POE, Col., Engrs. May 30

TREASURY DEPARTMENT, OFFICE OF
General Superintendent U. S. Life-Saving
Service, Washington, D. C., May 4, 1895. Sealed
proposals will be received at this office until 2
o'clock P. M. of Friday, the 31st day of May,
1895, for furnishing supplies required for use of
the Life-Saving Service for the fiscal year end-
ing June 30, 1896; the supplies to be delivered at
such points in New York City, Grand Haven,
Mich., and San Francisco, Cal., as may be re-
quired, and in the quantities named in the
specifications. The supplies needed consist of
beds and bedding, blocks and sheaves, cordage,
crockery, furniture, hardware, lamps, lanterns,
etc.; lumber, medicines, etc.; paints, oils, etc.;
shipchandlery, stoves, etc.; tools, and miscel-
laneous articles, all of which are enumerated in
the specifications attached to the forms of bid,
etc., which may be obtained upon application to
this office, or to the Inspector of Life-Saving
Stations, 24 State street, New York City; Su-
perintendent Eleventh Life-Saving District—
Grand Haven, Mich.; and Superintendent
Twelfth Life-Saving District, Appraisers' New
Building, San Francisco, Cal. Envelopes con-
taining proposals to be addressed to the "Gen-
eral Superintendent U. S. Life-Saving Service,
Washington, D. C.," and marked on the out-
side, "Proposal for Annual Supplies." The
right is reserved to reject any or all bids, and
to waive defects, if deemed for the interests
of the Government. S. I. KIMBALL, General
Superintendent, May 23

AMERICAN SHIP WINDLASS CO. P. O. BOX 53, PROVIDENCE, R. I.

BUILDERS OF THE

"Providence" Windlasses and Capstans

350 STYLES AND SIZES.
OVER 5000 IN USE.

SEND FOR CATALOGUE.

FRANK S. MANTON, AGENT.

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If you don't, give us a chance to prove that we can
coal your boats with quick dispatch, and with
most satisfactory fuel.

We have Four Large CHUTES on our Docks at AMHERSTBURG, ONTARIO,
1,000 FEET RIVER FRONT and Day and Night Force.

OUR STOCK CONSISTS OF

**"Keystone" Massillon, Youghioghny,
and Best Grades of Hocking Koals.**

O. W. SHIPMAN, MAIN OFFICE,
90 Griswold St., Detroit, Mich.



The Marine Manufacturing & Supply Co. 158 South St., NEW YORK.

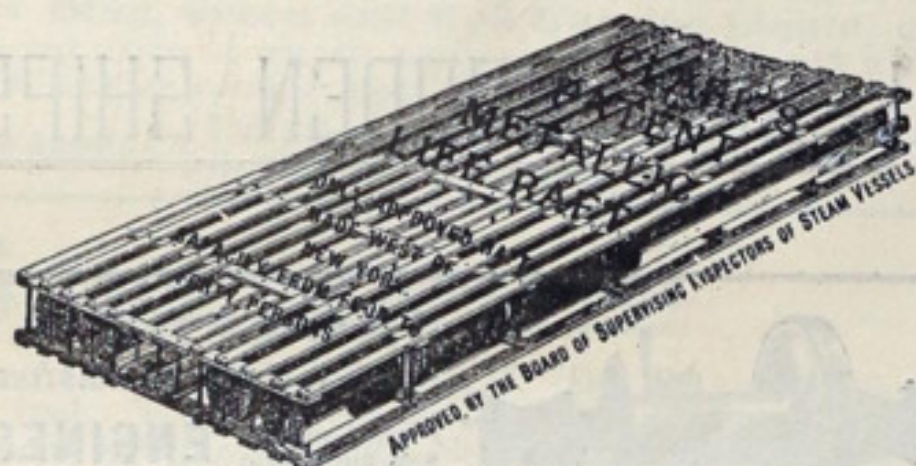
Manufacturers and dealers in Ship Machinery, Windlasses, Capstans, Winches, Pumps, Brass Work, "Monitor" Side and Deck Lights, Cannon, Rails, Stanchions.
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Estimates furnished for complete outfits for vessels.

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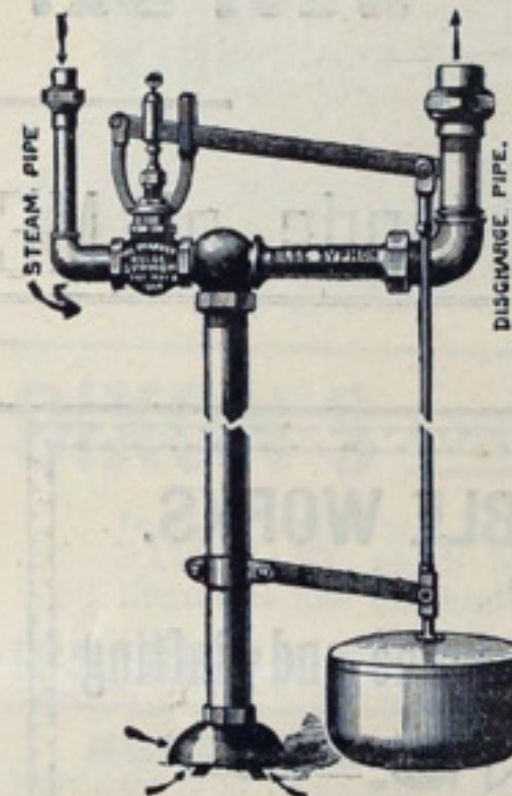
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It is the best, cheapest and surest way of keeping your vessel dry.
They are indorsed by leading Engineers throughout the country.
They commend themselves wherever placed. A dry bottom in ship's holds gains speed, which is equal to money.
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FORGED STEEL WATER-TUBE MARINE BOILER,

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BOILERS SOLD TO STEAMERS

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UNIQUE, HERO, H. M. S. HUNTER, SENECA, PRESIDENT.

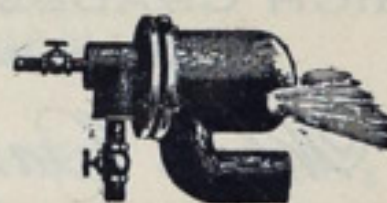
Under construction :—Two steamships for Dominion Coal Co.; One steamship, Chicago Shipbuilding Co.

THURMAN FUEL OIL BURNER CO.,

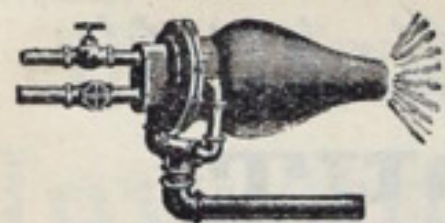
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General Offices, 31 and 32 Cordova Building,
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Acknowledged the best for Boilers, Forges, Furnaces, Ovens, etc. Write for Catalogues.



Hot Air from Furnace.
BURNER NO. 4.



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BURNER NO. 6.

BRANCHES : { 1401 Monadnock Block, Chicago, Ill.
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We have the only successful oil burner on the market for steam yachts with large or small boilers.

Burners for every branch of industry where heat for any purpose is used.

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Foot No. Market Street.
18th Street Bridge.
Illinois Central Slip "C."

Location of Fueling Docks indicated on the accompanying map by ⊛

TELEPHONE MAIN 1845.



Anthracite Receiving Docks.

	Capacity tons.
Kingsbury, bet. Erie and Indiana	60,000
Elston & Division, North Branch	60,000
Halsted and Division Sts., Canal	60,000
North Ave. Bridge, North Branch	40,000
South Halsted St. Bridge, South Branch	60,000

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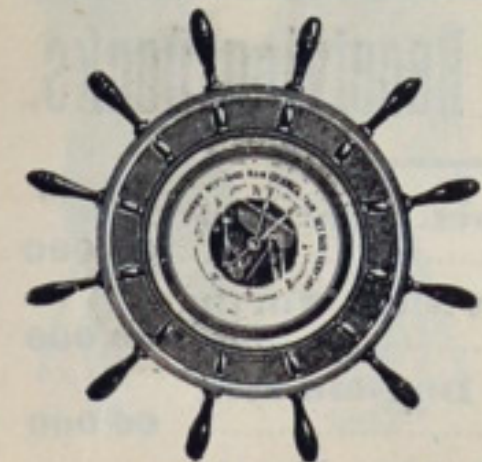
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For Paying Seams of Decks and other purposes.

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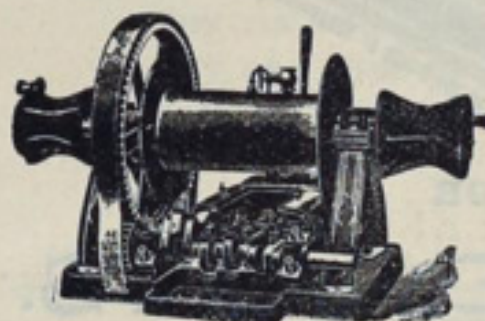
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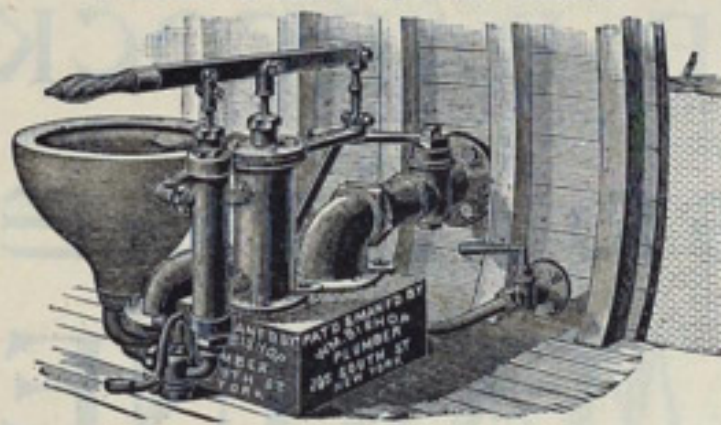
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Plain Finished and Automatic **ENGINES**, From Heavy Patterns
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Vertical, Horizontal, **BOILERS** Strictly First-Class
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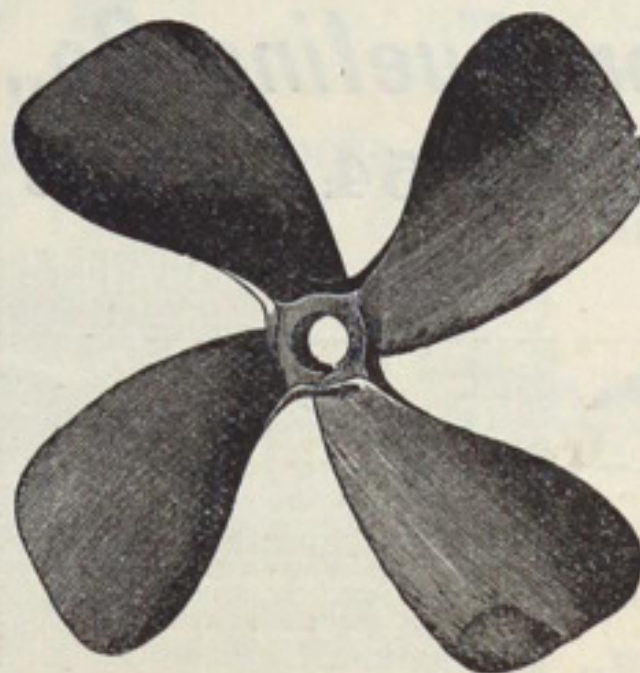
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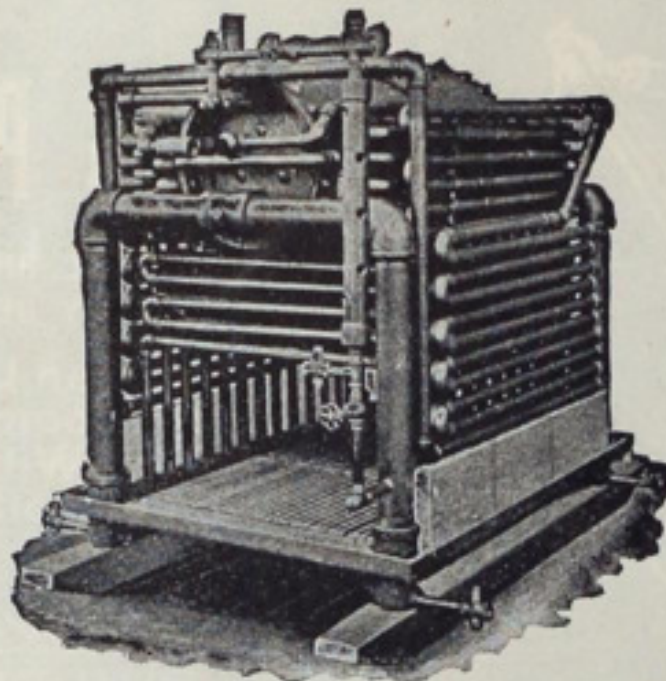
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**For YACHTS, LAUNCHES and
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Works covering 12,000 sq. ft. of ground
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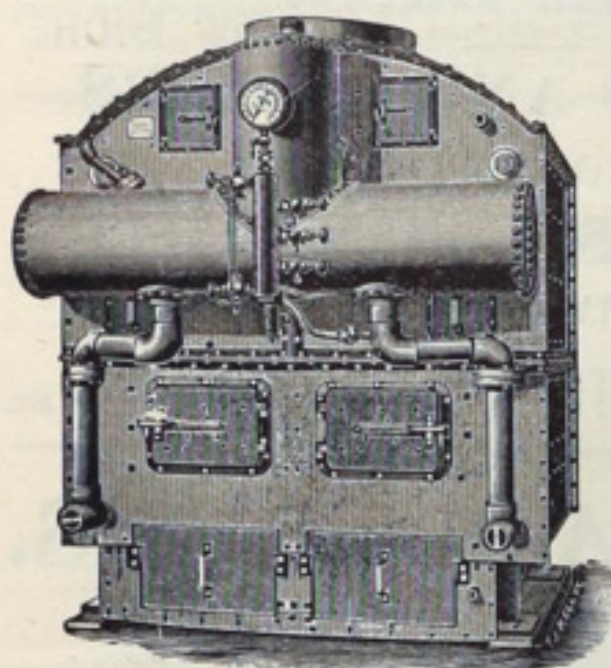
Enables you to MAKE A TIGHTER JOINT than you can possibly make with red lead. You can do it easier, and parts can be separated at any time without breaking anything. Send for sample and circular.

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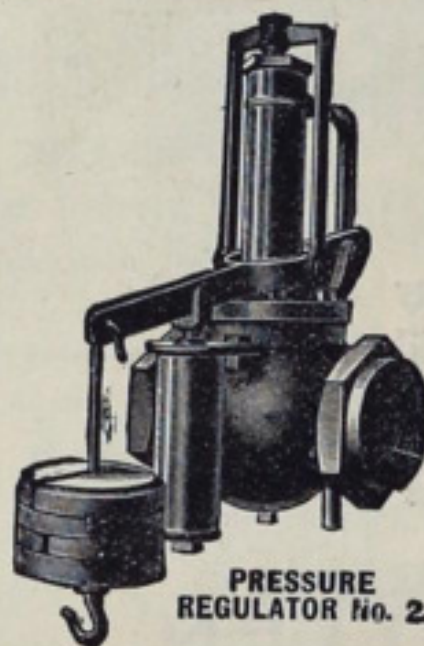
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Is the simplest and best for reducing the pressure to Steam Steering Engines, Donkey Engines, Steam Winches and all places requiring a uniform pressure below that of boilers.

No diaphragms, spring or packing.

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MADE IN TWO SIZES.

Are easy to adjust and can be handled by any one.

The Steerer can be arranged to set in pilot house or aft.

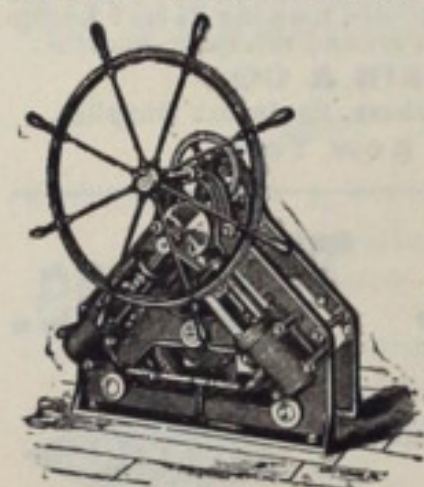
No Steerer will be sold without a quadrant.

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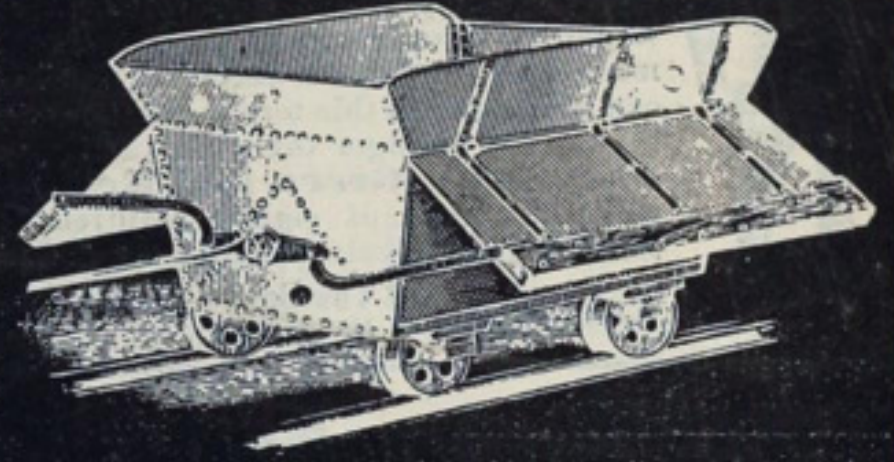
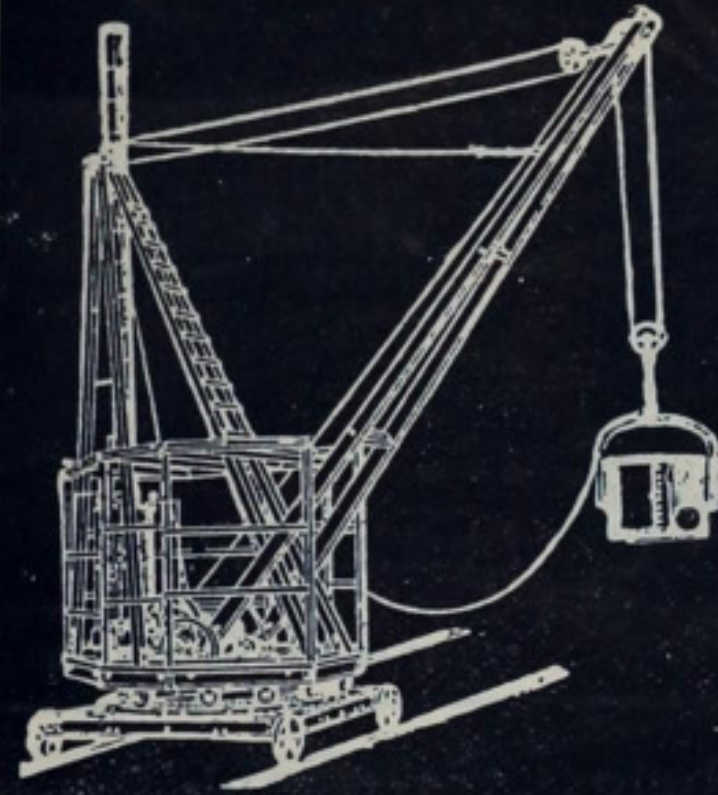
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FOR HANDLING COAL, ORE AND COARSE FREIGHT OF ANY DESCRIPTION.

This Derrick can Lift Load, Alter the Radius of Boom, Swing in Either Direction at Will of Operator, and can Propel Itself on Track any Desired Distance.

BUILT FOR ANY CAPACITY WANTED

BUILDERS OF
CONVEYORS, COAL BUCKETS, ORE
BUCKETS AND DUMP CARS.



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The TUG FAVORITE
STATIONED AT CHEBOYGAN MICH.
WITH COMPLETE WRECKING OUTFIT
IN CHARGE OF

Capt. MARTIN SWAIN

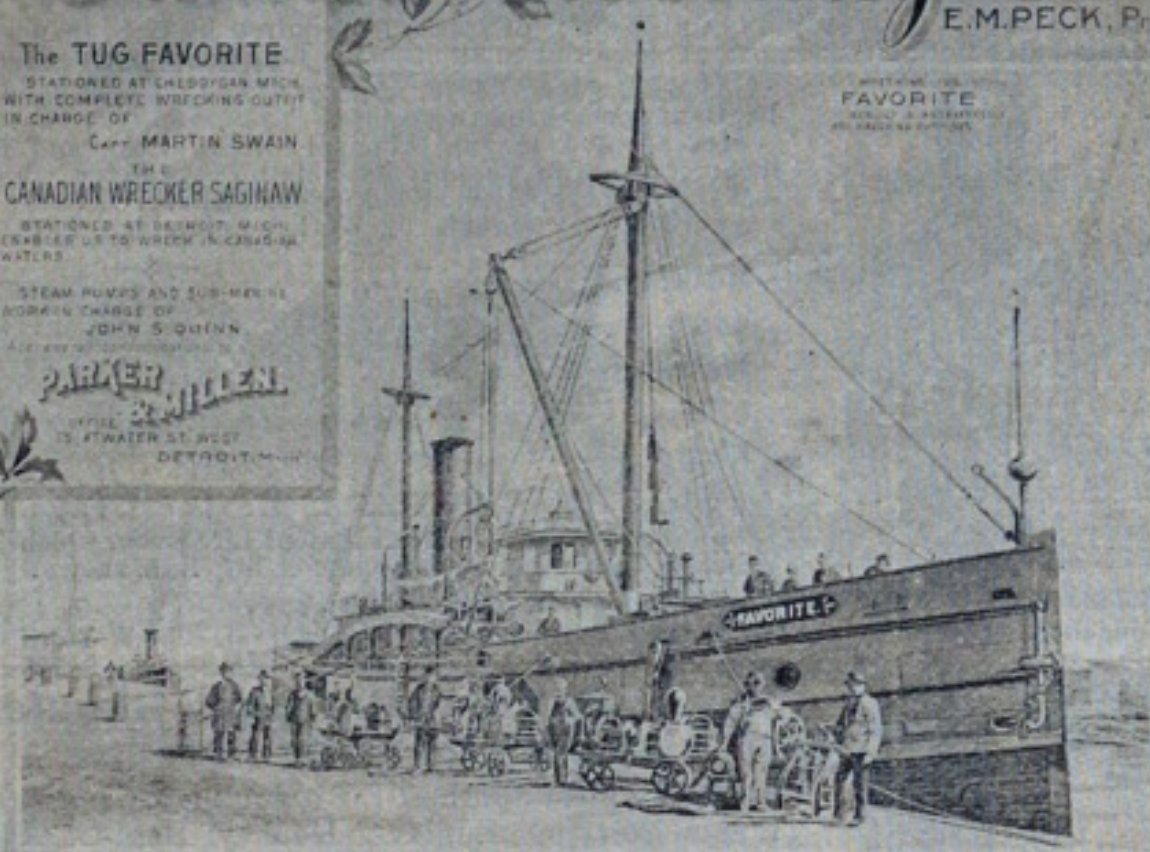
THE
CANADIAN WRECKER SAGINAW

STATIONED AT DETROIT MICH.
EQUIPPED TO WRECK IN CANADIAN
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STEAM PUMPS AND SUB-MER-
GIBLES IN CHARGE OF
JOHN S. QUINN

PARKER & MILLEN

15 WATER ST. WEST
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4 STEAM PUMPS, 10 JACKS, 3 HAWSEERS.

1 COAL AND ORE PUMP
3-12 INCH ROTARY.
1-14 INCH WORTHINGTON.

DIVING RIGS
AND
DIVERS
ABOARD
AT
ALL TIMES

1895	May	1895
Sunday	Monday	Tuesday
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24
25	26	27
28	29	30
31		

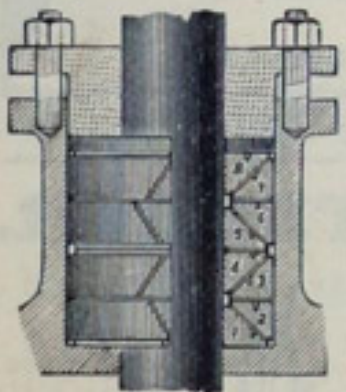
6-60 TON JACKS
1-12 INCH HAWSER

Telegraph
CAPT. M. SWAIN,
CHEBOYGAN
MICH.

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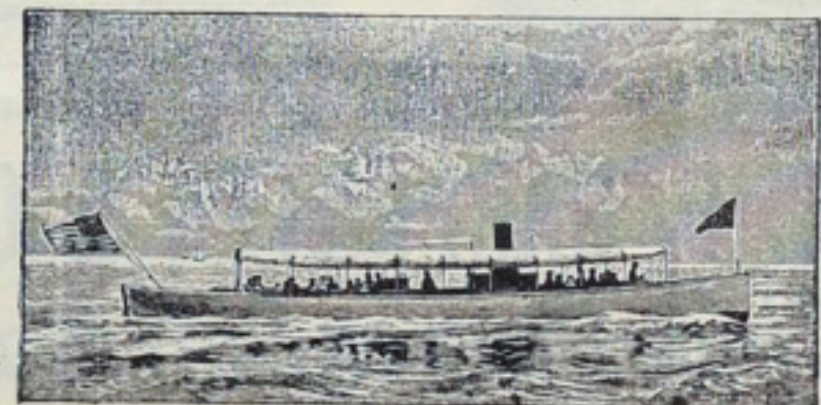
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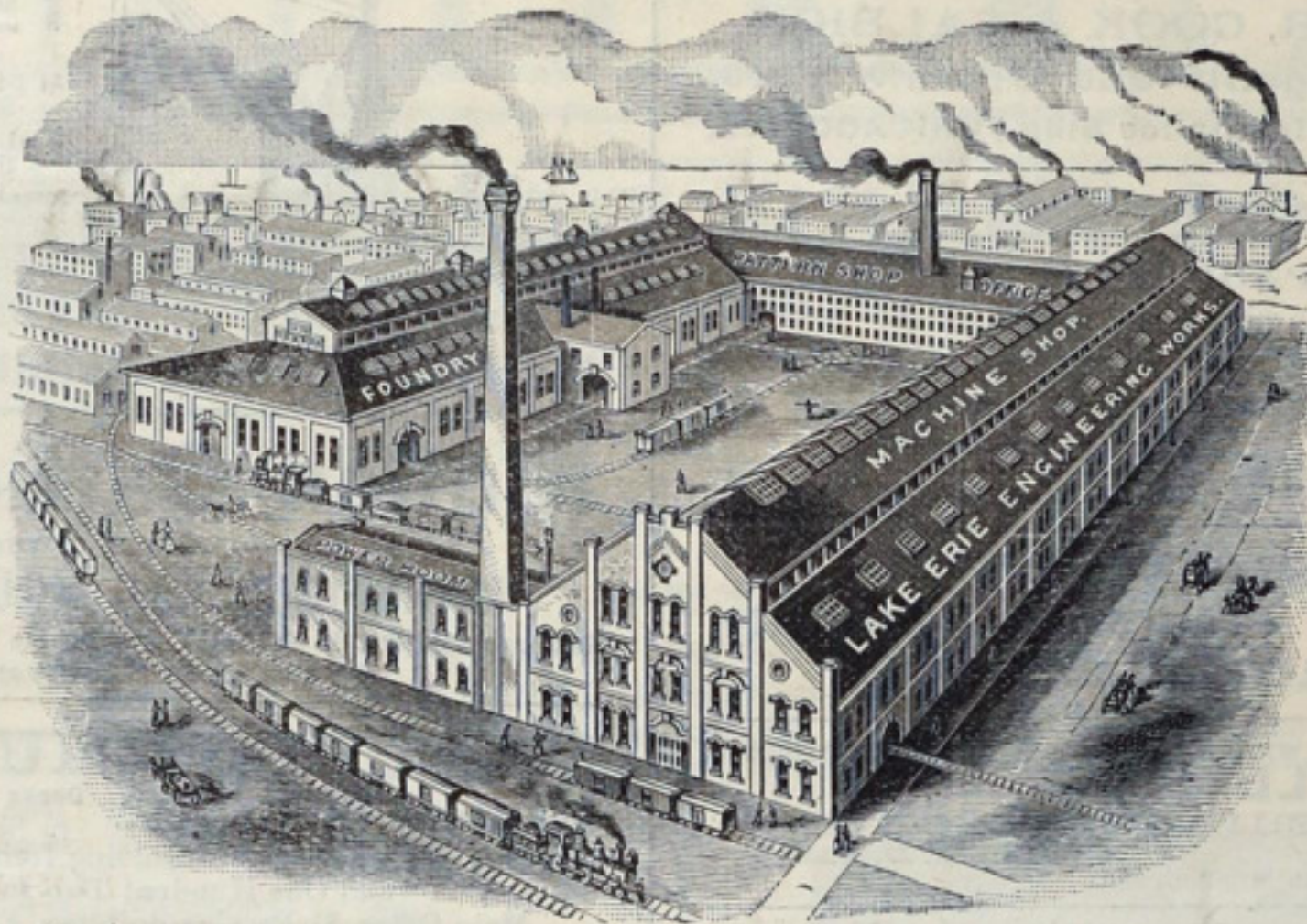
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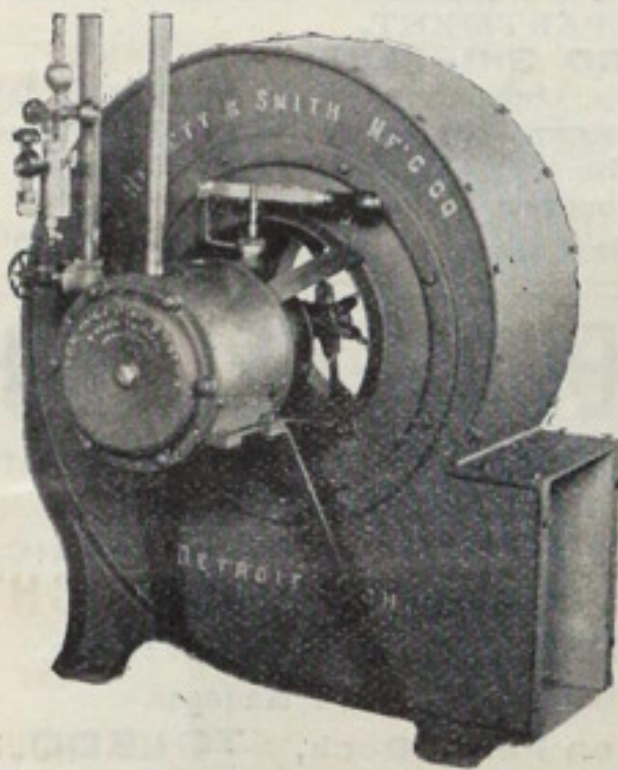
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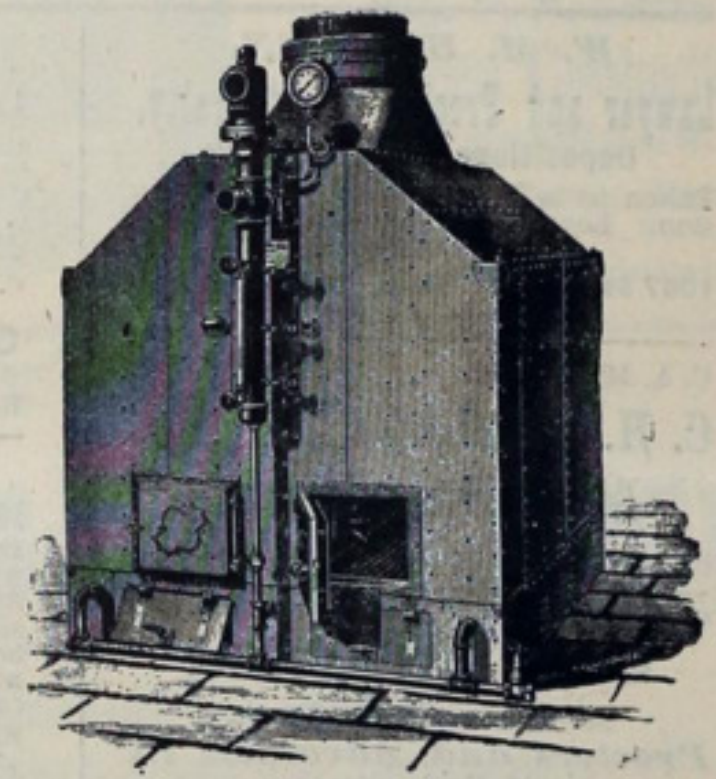
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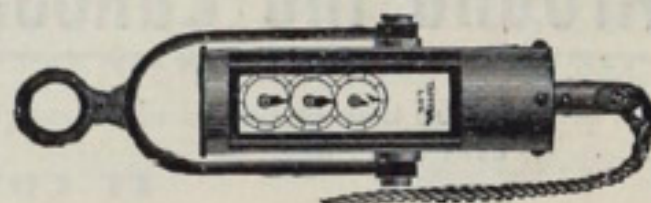
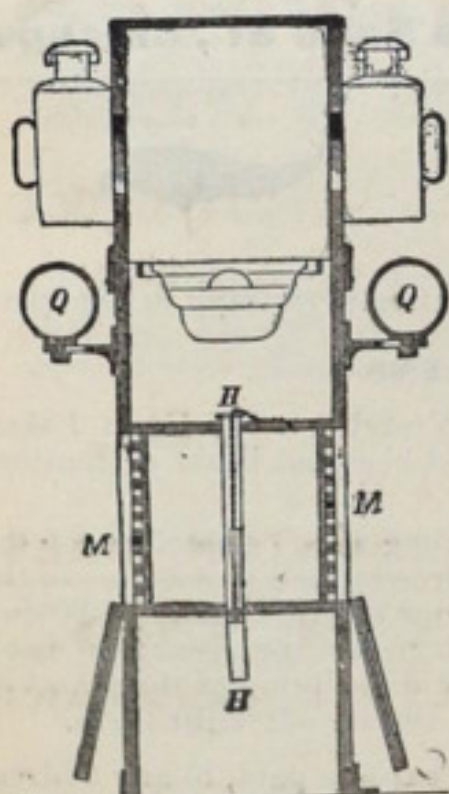


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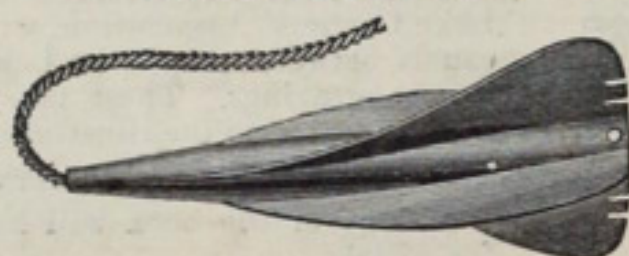
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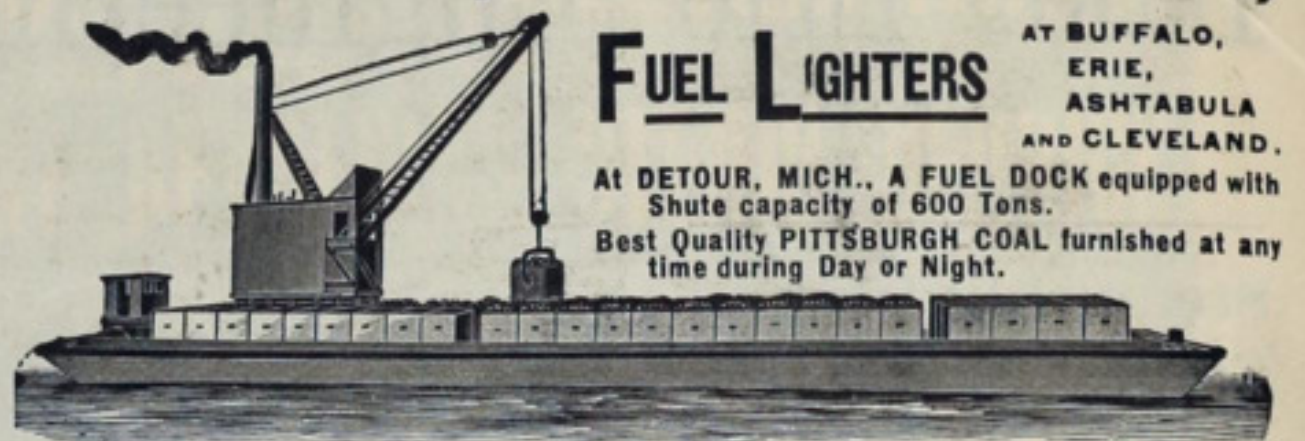


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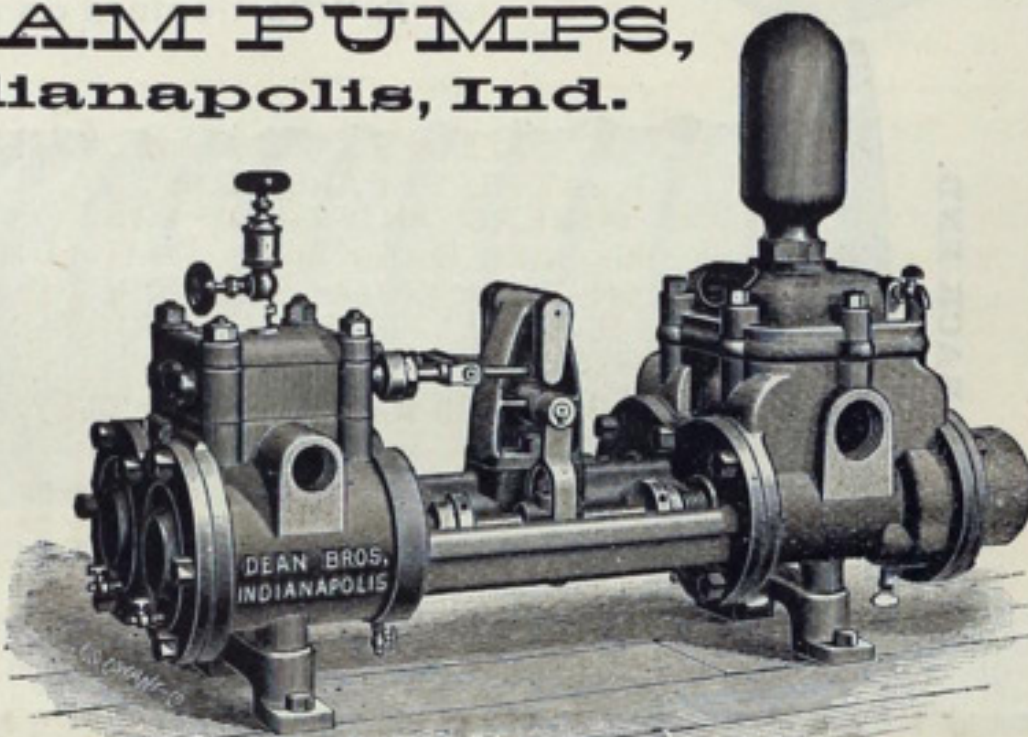
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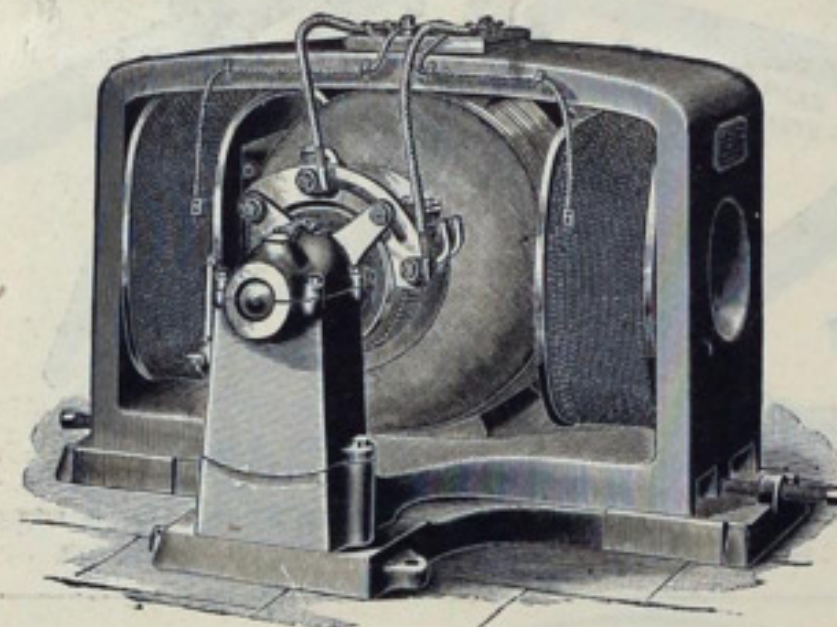
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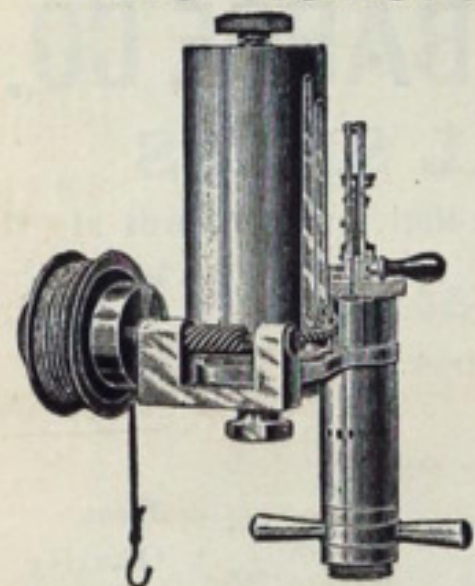
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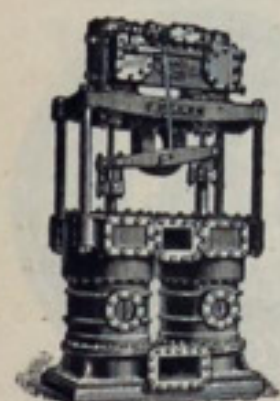


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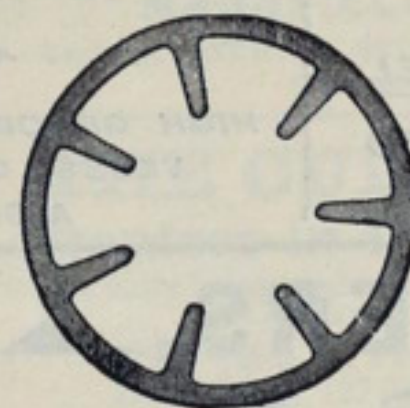


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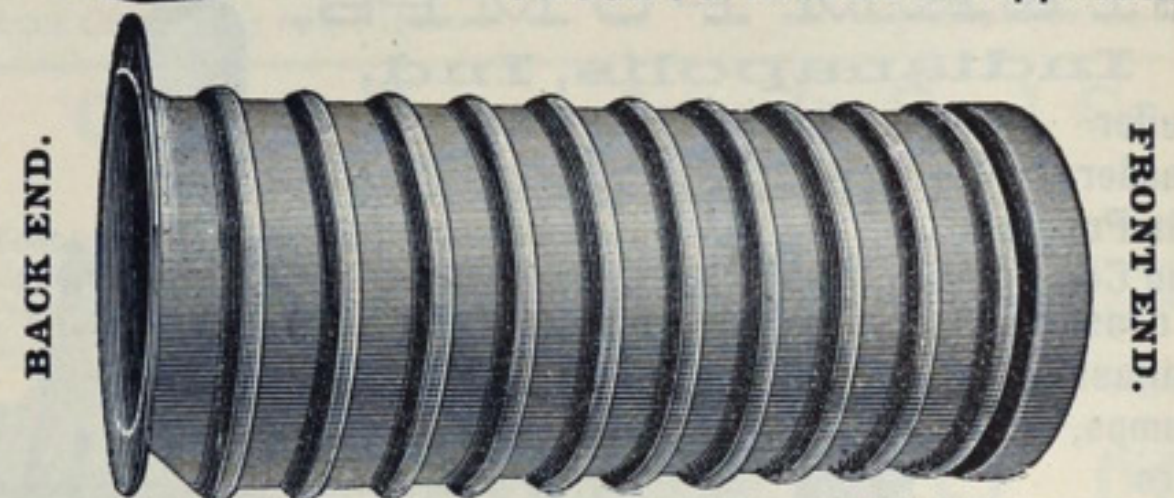
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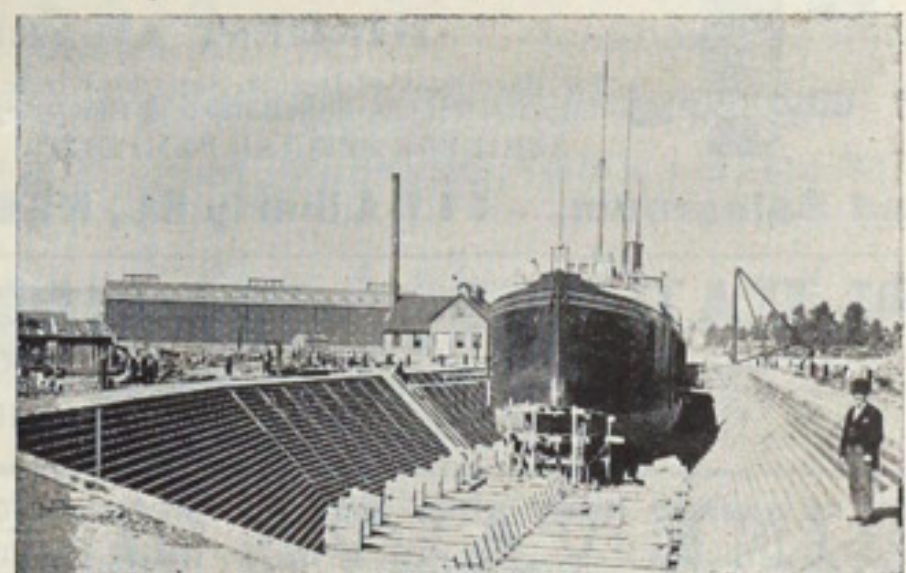
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